WILDFIRE STRIKES HOME!

SECOND EDITION

Prepared by the

National Fire Protection Association

in cooperation with

The National Wildland/Urban Interface Fire Protection Initiative

Members of the Initiative:

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National Association of State Foresters

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National Fire Protection Association

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USDA Forest Service

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United States Department of the Interior

Bureau of Land Management

Bureau of Indian Affairs

Fish and Wildlife Service

National Park Service

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United States Fire Administration

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A wildland fire was reported near the Junction of Painted Cave Road and State Road 154 in the Los Padres National Forest north of Goleta, California on Wednesday, June 27 at 6:02. It was to become the most damaging wildland/urban interface fire ever to strike California. Santa Barbara County is no stranger to major wildland and wildland/urban interface fires. An example is the 1977 Sycamore Canyon fire, which destroyed 200 expensive homes and caused damage of more than $36,000,000.

On the day of the Paint Fire the temperature was 103°F, relative humidity was 10 percent, fuel moisture content was extremely low (2.3), and there was a 12-15 m.p.h. north wind. The red flag alert warning system was in place the day before the fire, and this resulted in the prepositioning of resources throughout the county. Additional fire information and restrictions were put in place along with increased preparedness by the fire protection agencies in the area.

The Paint Fire was started by an arsonist at approximately 1800 hours in vegetation that had not burned in more than 40 years. Fuel loading was 20 to 40 tons per acre.

Five Santa Barbara county engines, one Forest Service engine, a low bed truck with a dozer on it, and a type 1 hotshot crew were prepositioned in the area of San Marcos Pass just three miles north of the point of origin of the fire. When smoke was reported, they proceeded to the area and were at the scene within a very few minutes. At that time the fire was estimated as 5-7 acres and was running downslope under a "sundowner" condition toward the communities of Goleta and Santa Barbara.

A sundowner is named because of its appearance near sunset when strong winds move downslope from the Santa Ynez Mountains above Santa Barbara and Goleta Valley into well-defined chaparral-covered canyons lined with expensive homes and ranches. The winds can reach 50-60 m.p.h. and produce temperatures to 105°F with a 10 percent relative humidity. Critical fire conditions can be produced until unusually late hours. The sundowner generally abates by early morning hours. On June 25 and 26 the sundowner influence was present and was further stressing the critically dry chaparral canopy foliage.

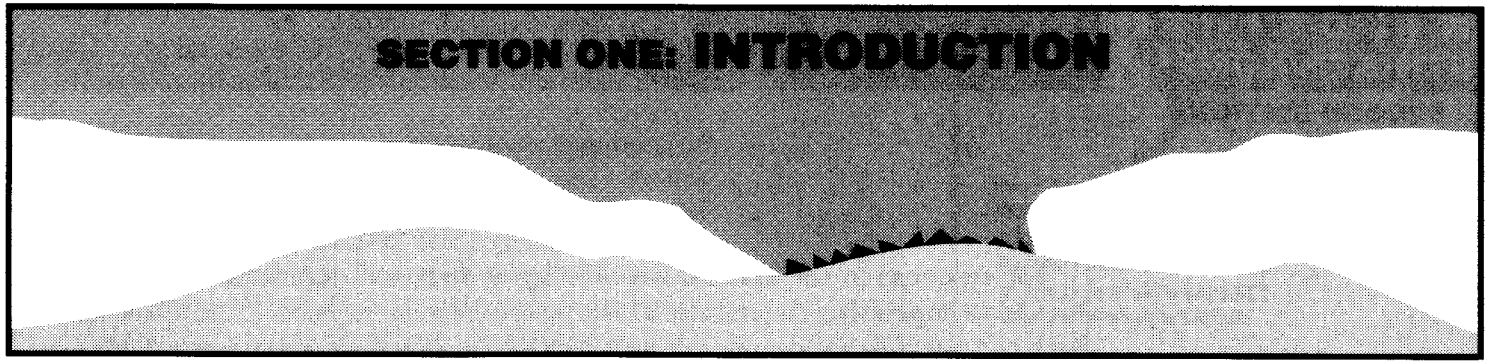
Additional units arrived at the Paint Fire shortly after the initial attack. The fire was declared a major incident and orders immediately were placed for additional resources from surrounding communities. The local interagency incident management team was also ordered to respond.

The fire spread rapidly, with reports of wind conditions in the 50-55 m.p.h. range. The fire quickly spread (200+ chains per hour) into scattered homes north and east of Goleta and then into other subdivisions. The fire crossed Highway 101 at approximately 7:30 pm. A major evacuation of several thousand residents was implemented, causing a great deal of difficulty for responding fire equipment attempting to reach the incident scene. Evacuees trying to get out and sightseers interested in seeing what was going on in the area complicated the situation.

The Paint Fire became the worst-ever wildland/urban interface fire

Losses included one fatality, a person trying to escape the fire was caught and overrun by the fire. Property losses included 420 single homes, 26 apartment units, four public buildings, one mobile home, two farm buildings and ten business structures and 15 other miscellaneous buildings. Property damage estimates exceed $250,000,000 for this incident. The fire burned a total of 4,900 acres. One fire fighting helicopter crashed with minor injuries to the pilot. The Paint Fire finally was contained on July 1.

Structural losses occurred primarily as a result of wood shake roofs, lack of defensible space, combustibles burning on wood decks, and single-pane windows broken by radiant heat, allowing embers inside the structure. ■



The first edition of *Wildfire Strikes Home!* was published to focus attention on a developing life-style trend and on how this trend affects fire safety. "For several reasons, we are seeing a major population shift from urban to rural living," said that introduction. "More and more homes are being built on scenic sites and slopes in forests and other wildlands. The result is that now vast areas of America contain high-value properties intermingled with highly flammable native vegetation."

And that native vegetation has many ways to ignite, from nature and from human action either accidental or intentional. Wildland fires often begin unnoticed in areas where no piped water supply is available. The result is that when ignited these fires quickly grow in size and intensity. Winds further help to spread wildland fires. What this means to homeowners in the wildland/urban interface is that their fire risk is not just the ignition of flammable vegetation on their own property, but also the ignition of vegetation fuels miles away. Burning brands carried on winds can start spot fires far in advance of the main fire front.

The large size and intensity and the effect of fire spotting makes control very difficult and sometimes impossible, even when large numbers of fire fighters are available with all the needed equipment to attempt suppression. More likely, however, is that any large fire grows larger while the necessary personnel and equipment is assembled for the attack.

Many new residents in wildland/urban interface areas are surprised to find that when they escaped from the high-tax urban areas they also left behind the stand-by, structural-type fire departments. Instead, the most common fire protection agency in the wildlands is provided to protect the valuable natural resources. The efficient, successful methods for protecting a forest's natural resources from a spreading fire were not designed with the idea that the forest would include numerous homes. And where structural fire departments were formed or extended to interface areas, their methods designed to extinguish a fire contained in a residence are not effective against the open power of a wildfire spreading beyond the reach of water mains and hydrants.

Economic limitations had prevented the cross-training and cross-equipping of all fire fighters to attack both of these vastly different types of fire which overlap in wildland/urban interface areas.

Throughout the mid-1980s fire protection officials began to report dramatic increases in the loss of homes to fires in interface areas. But that is not all that is causing serious concern of fire officials: "Major losses to life are also possible—in fact, inevitable."

The original introduction ended on a positive note, declaring that "The desirable qualities of rural living can be sustained and enjoyed...if the fire protection requirements are understood and respected."

The response to the first edition of *Wildfire Strikes Home!* was impressive. The available 20,000 copies were soon distributed nationally and demand remained high for a reprint. Response, however, was not limited to readership. Individuals and groups began to take action to further increase the awareness of local officials and homeowners. And they began to attack the problem from their different perspectives.

By 1989 the sponsoring organizations of the National Wildland/Urban Interface Fire Protection Initiative were aware that the Initiative had recorded much progress since the first printing. Rather than a simple reprint of the 1987 first edition, the Initiative sponsors decided to prepare this second edition. The intent was to again feature some of the still-relevant overview material from the first edition while presenting new material showing the scope of the progress made. Initiative sponsors believed such a presentation of the activities and products would serve four functions:

- To provide basic information on the nature of the wildland/urban interface fire problem.
- To motivate homeowners, local officials and fire protection agencies to become involved with this important issue.
- To recognize the hard and creative work already being done by leadership-minded people.
- To enhance the networking of individuals already working on the interface problem who wanted to share their information and learn from others.

The approach was to prepare a condensed version of the four chapters of the original first section, Defining the Problem, while updating the information where necessary.

The materials profiled in the three chapters of the next section of the first edition, Understanding Some of the Difficulties, was to be a reminder that this problem is a complex one that cannot be solved overnight or by any single group. People who are tuned in to this issue know well that it is difficult and that significant progress occurs only over long periods of time. Consequently, the "Difficulties" chapters are not forgotten but are condensed to a single page each.

The final section of this edition, Progress Toward Solutions: Examples of Local and National Activities, is the showcase of activities in response to the wildland/urban interface issue. The materials presented are diverse enough that perhaps there is literally something for everyone.

Certainly there remains much to be done. The activities profiled in the "Progress Toward Solutions" section do not indicate that anyone has yet been successful in reaching all of the public or eliminating all of the interface fires and home losses. But the progress report in the final section is nevertheless very important and worth recording.

The National Wildland/Urban Fire Protection Initiative is a response to the general increase in the loss of wildland homes to fires throughout the 1980s, but the disastrous wildfires that swept this country in 1985—and burned more wildland homes than ever before—succeeded in shocking fire protection officials. The problem was too big, obviously, for any single fire protection agency to handle. The growing presence of homes in the wildlands had complicated matters too much.

The best chance to reduce the problem before an unprecedented disaster involving perhaps hundreds of lives as well as property loss occurred would be for fire protection agencies to cooperate with other affected groups and individuals. Then they would all need to focus on how to reduce the threat before a wildfire started.

Early in 1986 representatives from the USDA Forest Service, the United States Fire Administration and the National Fire Protection Association met to discuss the issues. The complexity of the problem was obvious, as was the need to involve many disciplines in order to address the broad issues effectively.

A special task force of 25 key individuals representing the fire service, wildland fire protection agencies, insurance industry, architectural field, local government, wood products industry, research organizations, academia and other key organizations met at the National Fire Protection Association headquarters. The task force encouraged the three organizations to proceed with efforts to develop a national awareness of the interface fire problem. The goal was to provide expertise for the creation of a more fire-safe environment for those living within the wildland/urban interface.

As a next step the task force called for bringing together a larger group that could go beyond the initial overview of the problem and address more of the complex issues and in greater detail. The first national conference dealing with the wildland/urban interface issue was held during September 1986. More than a hundred experts from throughout the United States and Canada gathered in Denver for an intensive three-day meeting.

The participants reconfirmed that the problem did not involve only the fire protection agencies and the homeowners, but was affected by many other groups. Many people had already started addressing the problems, and there was a need to develop a system to allow people to exchange information on what has been effective and what has not. Outlines of possible strategies were developed at the conference.

Additional organizations signed on as sponsors of the Initiative, including the National Association of State Foresters and the United States Department of the Interior's Bureau of Land Management, Bureau of Indian Affairs, Fish and Wildlife Service and National Park Service.

In 1989 an international conference was held in Boston to consider global wildland fire challenges. The conference speakers reinforced the message that the challenges of living in harmony with the environment were universal.

Numerous activities are underway at the present time and much more work will be accomplished. Plans by the Initiative for the year ahead include continued preparation for national and regional conferences and workshops, publication of newsletters, booklets and training materials for both the public and the fire agencies, and development and national broadcasting of videotapes to further add understanding to these important subjects.

The impact of these activities gains strength through the additional broad range of activities undertaken at the state and local level to address this still-growing problem.

National Association of State Foresters

Since the first publication of Wildfire Strikes Home, the National Association of State Foresters (NASF) has proudly joined as a sponsor of the National Wildland/Urban Fire Protection Initiative. NASF is committed to its goal of educating the public on the problem of wildland/urban interface fires. We are confident combined efforts will lead to solutions for minimizing the incidents and reducing the devastation of this type of fire.

The directors of state forestry agencies have long established fire prevention and protection as priorities. As a member of the initiative, NASF has been successful in providing information to the public as well as to all the cooperative fire agencies.

This cooperative effort has helped promote a much stronger fire management program across the nation. During the last two years we have been challenged to provide fire suppression aid to many parts of the country. In response, firefighters from local, state and federal levels often worked together. The intermingling of backgrounds was made possible through the initiative, making us all more aware of the wildland/urban fire problem.

The National Wildland/Urban Fire Protection Initiative has continually been successful in achieving its goals of providing both information and solutions. Publications such as *Wildfire Strikes Home!, Second Edition,* help get the message out concerning the growing problem of wildfires in the wildland/urban interface. The addition of the progress report in this edition offers useful solutions which can be implemented locally to decrease the threat to lives and property from interface fires.

John W. Mixon
President

National Fire Protection Association

This second edition of *Wildfire Strikes Home!* is yet another example of the increasing level of cooperation among the fire protection community and other key organizations committed to addressing the wildland/urban interface fire problem. The National Fire Protection Association is proud to join with the other sponsors in producing this update.

Following a series of disastrous wildfires that swept this country and destroyed many wildland homes in 1985, the fire protection community realized that the best chance to reduce the problem was to assemble a special task force capable of examining the various perspectives of interface fire protection. I believe that meeting of professionals from the fire service, insurance industry, architectural field, local government, wood products industry, research organizations, land management agencies, academia and others inspired the cooperation that has led to many of the strategies and programs detailed here.

While we cannot expect to virtually eliminate wildland/urban interface fires, we have created a strong network to exchange information on what is effective and what is not. An ever-increasing number of people are fulfilling their desire to move out of urban areas and into a secluded, wooded environment. These people must hear our potentially life-saving message and understand the serious risks they face in their pristine environment.

This report provides encouraging evidence of what we can accomplish together and serves to motivate our continued cooperation. NFPA remains committed to this goal.

Robert W. Grant
President

USDA Forest Service

It was January of 1986 when representatives of the National Fire Protection Association, the U.S. Fire Administration and the USDA Forest Service first met to discuss the wildland/urban interface fire protection problem in the United States.

What prompted that meeting was the disastrous interface fires of 1985, which were chronicled in the first edition of *Wildfire Strikes Home!* The result of that first meeting was a decision on the part of the participating agencies to develop a national initiative with three basic goals: Create general public awareness of the problem; encourage the formation of partnerships among problem solvers and interest groups; and focus on the development of local solutions to the wildland/urban interface fire problem. A fourth objective, promoting fire fighter safety on wildland/urban interface fires, was added after 1987 when, for the first time, there were more fire fighter fatalities due to wildland fires in the U.S. than structural fires.

The National Association of State Foresters and Department of the Interior soon joined the initiative. Over the past four years the national initiative has sponsored three national conferences and one international conference, participated in over 30 state and local conferences, produced 10 videos for national satellite broadcasts, developed eight publications, carried out ongoing proactive public and news media awareness campaigns, and published a newsletter with a mailing list of over 16,000.

All of these activities are detailed in Section Four, "Progress Toward Solutions: Examples of Local and National Activities" of this publication. What is impressive to me, besides the outstanding projects from the national initiative, are the many creative programs and projects developed at the local and state level, which are also found in Section Four. It is exciting to see these efforts at the local level, which is where the solutions must be developed.

One of the reasons for deciding to include a progress report in the new edition of *Wildfire Strikes Home!* is to publicize what has been going on around the country. I think there are some great examples in Section Four that can help start or enhance programs in your area.

We haven't solved the wildland/urban interface fire problem in America. But I think the initiative and the efforts at the local level have been responsible for creating and raising awareness levels of all concerned about the need for integrated wildland/urban interface fire protection and prevention programs for the wildland/urban interface. But much more remains to be done.

It continues to be a priority program for the USDA Forest Service and I sincerely hope it does for your organization.

Allan J. West
Deputy Chief

United States Department of the Interior

The Department of the Interior recognizes the wildfire hazard associated with the wildland/urban inetrface as one of the most serious challenges to fire and land management during the next decade. Human life, property and increasingly valuable natural resources are at stake, and the number and cost of interface fires continue to rise.

Significant progress has been made in bringing the interface problem to the attention of elected officials, county and private planners, and other interested individuals during the past three years. This update continues the effort that was initiated by the first edition of *Wildfire Strikes Home!* It is critical that the momentum be continued, and that all segments of the National Wildland/Urban Interface Fire Protection Initiative commit themselves to realizing a lasting solution to this critical problem.

The cost of preventing Interface wildfires is remarkably low compared to the cost of suppressing them, and even lower when damages are considered. The Department of the Interior is determined to minimize the threat of wildfires, and is pleased to be a partner in this national effort to reduce the threat of wildfires in the wildland/urban interface.

David Neal
Assistant Secretary
Land and Minerals Management

United States Fire Administration (FEMA)

Since 1986 the United States Fire Administration (USFA) has joined with the USDA Forest Service and the National Fire Protection Association as a co-sponsor and participant in the National Wildland/Urban Interface Fire Protection Initiative. Much has been accomplished during this time. The Global Wildland Fire Conference conducted in Denver, Colorado, development of fire fighter safety programs, information dissemination designed to inform the public of the wildland/urban fire problem, and in-depth case studies of wildland/urban fires are but a few of the accomplishments of the Wildland/Urban Interface Initiative.

We have made progress, but much more remains to be done. In the coming year the USFA is planning a nationwide teleconference detailing the work that has been done during the past several years. The USFA will also co-sponsor a national workshop entitled "Wildland/Urban Fire Protection Programs in the 1990s." The United States Fire Administration will continue to be an active partner in developing strategies to minimize losses in the wildland/urban interface.

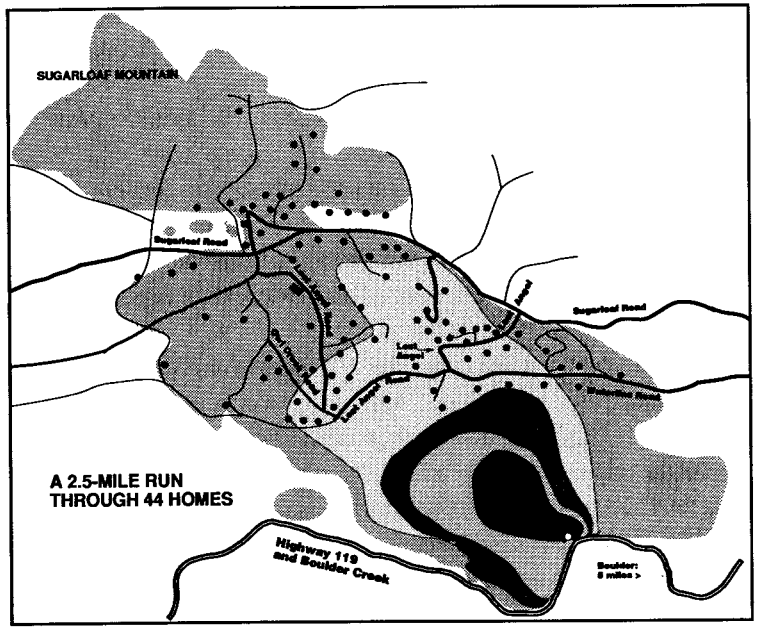
As people continue to move from the cities to the environment of the wildlands it becomes more of a challenge to continue to expand our efforts and resources to inform the public nationwide of the potential hazards involved in the interface areas. The USFA is committed to—and will continue to be an active participant of—the National Wildland/Urban Interface Initiative. With this united effort I feel sure that we can develop programs and strategies that will result in minimizing losses due to fire.

Olin L. Greene
Administrator

Hot, dry, windy. The Black Tiger Fire (see abstract in Research & Technology Section) began in a scenic suburban area five miles from Boulder. Rain had not fallen for at least 30 days, and the dryness was accompanied by a continuing period of high temperatures. On July 9 the reading was again near 100 degrees.

Topography was a significant factor in the fire's behavior. The fire began on private property along Highway 119, which runs beside Boulder Creek. Officials believed a carelessly discarded cigarette was the source of ignition. The fire area sloped up an average of 23 percent for about 2.5 miles from Black Tiger Gulch toward Sugarloaf Mountain, with an elevation of almost 9,000 feet. The slope increased to 34 percent nearer to the mountain. Upslope winds on July 9 were described as stronger than normal. When the fire began, it was funneled up through the heavy vegetation of Black Tiger Gulch.

The lack of small, natural or prescribed fires or vegetative management measures in the area had allowed a heavy buildup of dead trees, limbs and brush on the forest floor. This fuel arrangement facilitated the conversion of a surface fire to a crown fire, even before the fire reached the first homes. Fuel types contributed to the unmanageable intensity of the fire. Crowning quickly occurred in the ponderosa pine at the area of fire origin. Crown fires in dried fuels under windy conditions caused fire spotting as far as one-third mile ahead of the main front and further accelerated fire spread. Other fuels in the path of the fire included Douglas fir, mixed conifer and dry meadow grasses.



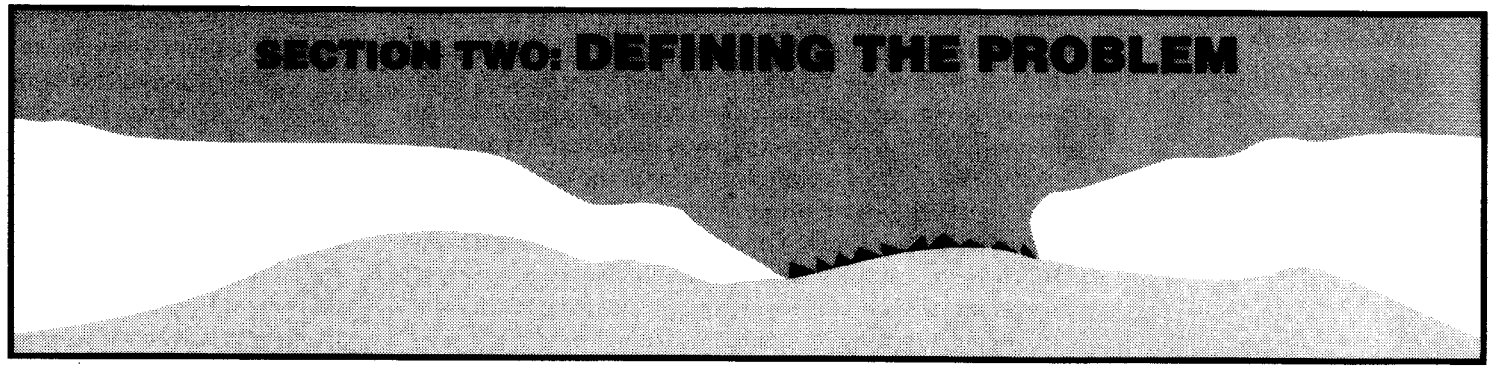
Numerous houses—from rustic cabins to larger, expensive homes—were scattered among the trees. Many were uninsured or underinsured. Most had inadequate clearance of flammable vegetation from the homes. Access for emergency vehicles was hampered by the narrow, winding roads and often-long driveways lacking sufficient turnaround space. Typical exterior construction of the homes was wood.

The local volunteer fire department responded rapidly with a full complement of personnel. On arrival the crews reported a fire covering 40 by 100 feet, but the direction of spread up Black Tiger Gulch was toward thick vegetation sloping away from any road for fire vehicles. The fire, with an initial rate of spread averaging 78 feet per minute, simply outran the fire fighters on foot. Crowning was reported within 15 minutes of fire department arrival. By the time fire vehicles circled up to the next road, the fire intensity was too great to control.

As the fire front broadened, two types of fires were noted, and both had a similar resistance to control. Fires in the dry meadow grasses spread rapidly but through fuels of low energy density. Fires in the trees spread more slowly but these fuels had higher energy densities.

Mutual aid responded from local, state and federal fire protection agencies. Many were still responding when the first area of homes at the rim of Black Tiger Gulch was overrun. The rapid growth of the fire required a multijurisdictional fire attack that complicated the command structure and strained the communications system. Fuel types and their proximity to structures determined in large part where defenses might be possible. Many of the homes in the path of the highest fire intensity could not be saved, regardless of available fire protection personnel and equipment.

By 6:30 that night the fire had spread to 1,500 acres, and had destroyed 44 homes and other structures. Other homes were damaged, some severely. Fortunately, no other structures would be lost after the first afternoon. However the fire continued to burn into a fifth day, covering a total of 2,100 acres. The total loss of homes and natural resources amounted to $10 million. No arrests have been made in this incident. ■



Before all of the individuals and groups affected by the wildland/urban interface fire problem can understand the issue and begin to apply their varied experiences toward a solution, the nature of the problem must be defined. Although interface areas represent a potential hazard from coast to coast, its definition must be flexible to cover local situations.

All of the organizations submitting material for *Section Four: Progress Toward Solutions: Examples of Local and National Activities* first had to define the problem from their own perspectives. And each item produced had to define the problem for the particular intended audience.

Fire in crowded urban areas is a problem that is usually easy to see and grasp, but wildfire more often occurs in remote, less populated areas, away from personal experience and the probing eye of the television news camera. Many homeowners would say that they had seen reports of major wildfires, usually in California, but the tendency is to believe that wildfire tragedies happen to "the other guy." In defining the problem it is important to describe the threat to homes in the wildlands in terms the particular homeowners or developers or officials will understand, accept and respond to in a positive manner.

The chapters in this section begin to lay the foundation for understanding what is happening in the wildland/urban interface.

The Fire Risk: Phantom or Real? This title expresses some of the skepticism of a busy population. It is a legitimate question because everyone already has what they consider a "full plate" of problems pressing for attention. Homeowners, developers, legislators and even fire fighters want to know what kind of priority to assign to this particular problem. The available information indicates that this continues to be a very real problem.

An American Dream: A Home in the Woods. However real the fire danger is, people are going to continue building and buying homes among the wildlands to escape the pressure of congested cities. The same factors that started an unprecedented number of people moving away from the cities and suburbs in the early 1980s is only increasing in the 1990s. Fire protection officials do not seek to prevent this migration to the wildlands—only to help wildland residents cope with the natural and man-made hazards and thus be able to better enjoy the scenic beauty.

A New Challenge for the Fire Services. Introducing more people into the wildlands will only increase the frequency and severity of fires in the wildlands. Yet, the fire services face multiple dilemmas: wildland fire agencies are called on to protect structures, while structure fire departments are called on to protect wildlands; rural residents want to pay lower taxes, but at the same time expect fully equipped and standby fire protection available at a moment's notice; and time needs to be spent both preventing fires and training to suppress fires.

Recognizing the Regional Differences. The public tends to become more aware of a problem when they perceive it to be closer to home. This may be a national problem, but the real success will be won at the more focused regional and local levels where the messages that work will be relevant to regional values and experiences.

You don't need another problem to worry about, right?

You've got the possibility of global warming, perhaps another economic recession, and your back aches. Besides, you're busy... So what do you care about this problem with wildfires in the residential/wildland interface? What does that mean, anyway? You probably want to know one thing from the start: Is this only a phantom problem, or is it real?

It used to be easier to decide about an urban area or a rural area. Trees were in the forests and homes were in the cities. There were exceptions, but just about everything could be classified simply as urban or rural.

Fires occurred both in the forests and in the cities, so communities and governments provided for fire fighters. Some fire fighters were specially trained to protect the forest vegetation, and others were specially trained to protect the cities.

Then people began to move more of their homes from the cities out to the edges of the beautiful, peaceful forests and other wildlands. This became the "interface," the point at which diverse systems meet and interact. And have the wildfires continued? Is the problem phantom, or is it real? Consider the experiences of one community in the interface:

The weather rarely cooperates. First, the winter snowfall was less than normal, so the spring melt-off failed to fill the streams and rivers. Then the spring rains were less than normal. By summer the drought was serious.

But the town's main industry, lumbering, was thriving. The town itself had been built at the very edge of the huge forest to be close to the raw material it processed. A river was in just the right spot to help with transportation of the unwieldy lengths of cut timber.

It was a scenic spot, chosen for "beauty as well as business." One person noted that, "The business and residence streets were wide and well laid out, the houses prettily built and carefully painted, and little ornamental gardens were frequent."

If only the rains would come...

But instead, one Sunday evening in October the fires came roaring out of the forest. The flames were too wide and moving too fast to be stopped by fire fighters.

To put it simply, the entire town was wiped off the map. Every building. When the disaster was over, as many as 1500 people had died in the area. More than 1,200,000 acres of valuable timberland had burned.

One day after the fire caused what is still called "America's greatest natural disaster," the rain finally started to fall again. But it was too late for Peshtigo, Wisconsin, in 1871.

Wildfire disasters build up in small parts: Citizens benefiting from a close proximity to forests and wildlands. Unusually low rainfall. Perhaps high winds. Somehow a small fire starts. And grows. Suddenly homes and communities and the citizens themselves are threatened by a fast-spreading wildfire.

But it couldn't happen in this century. Or could it?

Little or no rain had fallen on California for six months in 1970. Now it was the season of low humidity, usually below 10 percent and occasionally only 1 and 2 percent. And it was a time of heat, when recent temperatures had soared above 100 degrees for several days on end. But that was not the end of the extreme weather conditions. The winds blew, too, through the end of September and into October, gusting at speeds up to 80 miles per hour.

Hundreds of separate fires began, and the dried vegetation was waiting to spread the flames rapidly. In the 13-day period starting September 22, more than 750 separate fires were ignited from many different causes.

These fires grew and swept over the state burning nearly 580,000 acres of wildland, equal to a strip of land 1.2 miles wide stretching from the Oregon border to the Mexican border. But that was not all. Sixteen lives were lost, along with 772 homes. Thousands of structures were damaged. Fire suppression costs were estimated at $233 million.

But it couldn't happen these days. Or could it?

Unfortunately, it could.

In the one hundred and fifteen years since the Peshtigo fire, much technological progress has been made in understanding and controlling wildland fires, yet major disasters are still possible. The following incident occurred in 1983:

The area had recorded the lowest amount of rainfall ever. Now it was hot and dry, and the wind was gusting almost 45 miles per hour, which further dried out the pine trees and other vegetation. Fire fighters were on the alert and quickly contained most of the fires first reported to them. Relentlessly, more and more fires were ignited, reducing the available resources to fight each new one.

A weather change brought a wind shift and even stronger winds. Now they were steady around 40 miles per hour and gusting to 60. Several fires veered off and joined into a massive front.

These were not just brushfires back in the hills, where the smoke was barely noticed. These fires swept into and through towns and villages in a single day.

When the disaster had ended, 3500 people had been injured and 2528 homes had been destroyed. Seventy-seven people had died, along with 300,000 farm animals.

The disaster became known as the Ash Wednesday Fire. More than 840,000 acres of urban, forested and pastoral lands in Victoria and South Australia were burned over.

But it couldn't happen in this country in the 1990s. And it couldn't happen outside of California. Or could it?

Unfortunately, it could.

Despite greater awareness of homeowners about the threat of wildland living, and despite the increased fire prevention activity, devastating wildfires continue to strike homes today. Although major fires in California frequently make the national evening news on television, any state can be the next victim.

In May 1990 a Michigan wildfire (see page 28) destroyed 81 homes and many other structures, vehicles and recreational equipment such as boats and campers.

In June lightning started a wildfire in Arizona's Tonto National Forest, but the fire was not limited to those boundaries. During the attempt to extinguish the fire a dry thunderstorm with erratic winds passed over the area and caused the fire to make a major run. The out-of-control fire overran a fire crew and caused six fatalities, with five other injuries. In addition to that tragedy, 53 homes were destroyed (47 in a single residential subdivision), many others were damaged, and more than 1,000 residents were evacuated.

But aren't those local incidents unique? This couldn't be a national problem. Or could it?

Unfortunately, it could.

Changing trends in this country—along with periodic extreme weather conditions—have resulted in wildland fire dangers similar to the Peshtigo Fire and the Ash Wednesday Fire. And the population growth in the United States since 1871 means that more people are at risk.

Here's the approximate national toll from wildland fires in 1985, a catastrophic year that prompted massive action leading to the National Wildland/Urban Interface Fire Protection Initiative:

- 44 civilians and fire fighters died.
- 3,000,000 acres burned.
- 1400 homes and structures destroyed or damaged.
- $400,000,000 cost to federal, state and local fire agencies.
- $500,000,000 in estimated damages to property and natural resources.

The 1985 wildland fire season was one of the most severe in this century. Property losses were the highest since the Peshtigo fire 115 years previously.

During 1986, in three states alone, wildland fires forced the evacuation of 13,500 people from their homes.

The 1987 fire season started slow, but western fires began to

rage at the end of August. In less than two weeks 1,905 fires, which destroyed almost 750,000 acres, were reported in California and Oregon. The Southern states were hit. By November 7 nearly 6,000 fire fighters were battling the blazes. 1987 proved to be the worst-ever year for fire fighter fatalities at wildland fires (see the chapter titled *A New Challenge for the Fire Services*), which jumped 22 from the previous year total of 14.

Each year seems to spin a dial and the loser suffers historic losses. In 1988 the worst-ever season of wildfires hit Texas. A series of massive fires also pounded other Western states, and more history-making fires—249 separate ones were counted—hit Yellowstone National Park.

Colorado was hit hard in 1989. At the Black Tiger Fire near Boulder in July, 44 homes and other structures were lost. Many of them were uninsured or underinsured. Wildfire spread to 25 homes near Boise, Idaho at the Lowman Fire.

1990 showed no indication of a declining trend. Hot, dry weather conditions in California put wildfires there back in the news in June. One fire near Glendale burned 66 homes, of which 46 were a total loss. Embers drifted over eight lanes of the Glendale Freeway to start new fires and threaten more residences. The same weather combination contributed to the Paint Fire near Santa Barbara, where 420 single homes, four public buildings, one mobile home, two farm buildings and ten business structures were lost. One person trying to escape the fire was overrun and killed (See page 4). Property damage exceeded $250,000,000.

As *Wildfire Strikes Home!* Second Edition is being completed in November, approximately 850 homes have been lost to wildfires in the United States during 1990.

Is this progress?

So, what is happening to cause this unenviable record?

The loss of lives and property is part of a developing new trend. A major population shift from urban to suburban living, which began after World War II, has greatly expanded what we call the wildland/urban interface, for reasons not related to timber or other traditional forest uses. While this trend has increased the general population's appreciation for the aesthetic value of forests, it has also greatly increased the number of primary residences, second homes, and retirement homes located in forests and wildlands.

The result is that now vast areas of the United States contain high-value properties intermingled with flammable native vegetation.

Structural fire losses in these areas are increasing dramatically as more people build and live in closer proximity to flammable plant communities, and major losses to life are possible—in fact, inevitable.

The problem is not, as is often believed, unique to Southern California. The extension of residential and commercial development into high risk areas has been noted throughout the nation.

Huge fires are not required for catastrophic losses to occur in the modern wildland/urban interface. Even small fires can be killers. In 1985 three homeowners died when an 8-acre fire swept their subdivision. Fire management must change in order to better prevent and suppress smaller, fast-moving fires as the wildland/urban interface continues to expand through the remainder of this century. The change must occur nationally.

The task of protecting lives and property from wildfires in the wildland/urban interface poses one of the most important and elusive problems faced by wildfire protection agencies.

These wildfire protection agencies see many parts to the problem:

- Fire managers find it difficult to reliably predict erratic fire behavior in the mixture of structures, ornamental vegetation, and wildland fuels found in the interface. Physical fuel properties and moisture relations in these areas, which are governed by both natural and man-made phenomena, are not well understood. Fire spotting ahead of a wildfire, for example, is especially difficult to forecast due to the diversity of firebrand materials and unusually complex wind patterns; yet spotting is the chief cause of structural fire ignitions in wildland/urban interface areas.
- The use of prescribed fire for hazard reduction (fires purposely set to remove undesirable vegetation) is made difficult by legal, political and environmental concerns. Liability for damages to adjacent private lands is a significant deterrent. Residents almost always oppose the smoke that accompanies these useful

fires. Nonetheless, means must be found to manage fire hazards in the interface. The challenge is to do so while maintaining or enhancing desired environmental or economic values.

- Many property owners are unaware of the wildfire threat, while fire safety ordinances and building codes are frequently inadequate, unenforced and disregarded. A prime example is the insistence on combustible roofing materials. The design of subdivisions also continues to defy common fire safety principles. Many areas include narrow, winding, or dead-end roads that limit access by large emergency vehicles. Many areas have inadequate water systems. Without strong motivation to change, homeowners and developers will continue to produce, maintain, and inhabit these dangerous living environments.

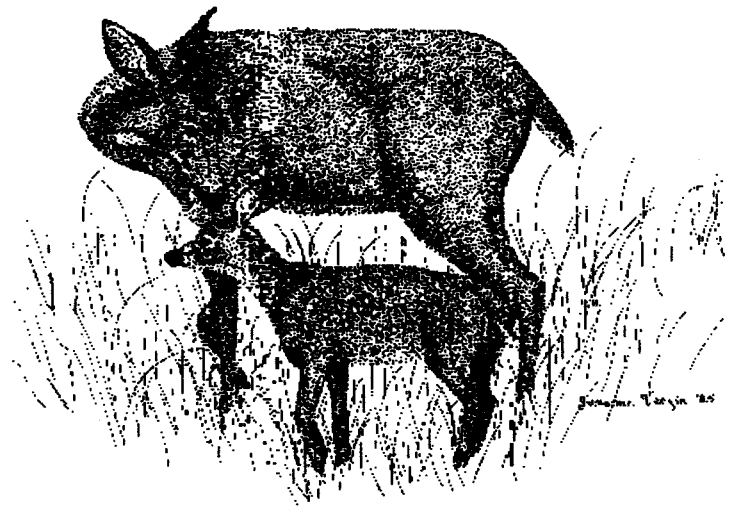
- Most wildfire suppression personnel are inadequately prepared for fighting structural fires, while municipal fire departments are not always fully trained or equipped for wildland fire suppression. Although relatively new organizational systems for integrating a variety of fire protection resources and personnel have proven effective, the special demands of fires in the wildland/urban interface often force fire fighters to perform unfamiliar tasks. The need to combine structural and vegetation fire fighting expertise on interface fires remains a formidable challenge.

The following actions and products are needed:

- Effective techniques and strategies to assess and manage fire hazards in the wildland/urban interface.
- Aids for planning, budgeting, and training for increased involvement in the wildland/urban interface to ensure a balanced capability in conducting structural and wildland fire suppression activities.
- Effective ways to educate property owners, land developers, insurance carriers and local planners about vegetation fire problems and solutions.
- Increased knowledge about the physics of fire spotting, crowning and radiant heat in the wildland/urban interface.
- Improved understanding of why people build fire-prone homes in the highly flammable areas, and how they respond to various motivational tactics to reduce their vulnerability.

Who is responsible for the solution? The fire protection agency? The homeowner? The county planner? Insurance carriers? Builders? Architects? The responsibility for fire safety cannot be relegated to a single element of society. It calls for the combined efforts of governmental agencies, the private sector and individuals.

We all must take a hand in solving the problem. We all must avoid a twentieth century Peshtigo or an American Ash Wednesday. There is no justification for continuation of this serious hazard to life and property.



You may not have noticed, but your neighbors are on the move. And more and more of them are moving out of the cities. In recent times, the suburbs were the destination, but now they are losing the competition for the newest wave of migrants.

Unlike some historical migrations, this movement is not the result of a sudden and forced upheaval of society. This time, rather, the new migrants are making changes that are their own choices. They are pursuing the new American Dream: settling into homes in more peaceful, less expensive, and more beautiful rural areas.

This information alone is not startling news. As a nation, our values and circumstances have often changed over time; this is not the first significant change in where we have chosen to build our homes.

When new settlers first reached this continent, they were concentrated in the few villages and small towns for mutual support.

Then additional settlers began to disperse farther from the towns, where they could find plentiful land on which to build farms. Even into this century, as recent as 1910, the majority of Americans lived in rural areas.

But the economic lures of industrial America, which was clustered in urban areas, began to replace the old trend with population shifting back to the cities. By 1920 the population majority had shifted to the urban areas. Not much changed in this respect for the next fifty years.

Then during the 1970s, the first evidence of another large reverse migration could be detected, as the rural population began to grow almost as fast than the urban population. At the end of that decade, the 1980 census verified the new trend.

Looking specifically at rural counties around the nation's forests, the United States Forest Service reported a population increase of 23.4 percent between 1970 and 1980, more than twice the 11.4 percent gain for the nation.

The trend will continue. A 1985 Gallop poll indicated that three out of five people in America preferred living in spacious, low-density areas. A community of 50,000 was the largest settlement

Escaping the pressures of urban life: The lure of wildland homes is captured in this excerpt from a presentation given by C. P. Butler, a Senior Fellow of the California Academy of Science, in 1974. It is still true today.

"The root of the problems described here stems largely from an almost universal desire to live in a natural or rural environment. The words of writers like Thoreau and John Muir can readily be savored by the man who has been working all day in a city jungle, if in the evening he can return to his home where the only things he can see are the blue of the sky and the green leaves shielding him from all eyes.

"In planning their first home, young couples delight in selecting a site covered with native growth. This desire is not lost on the architect who furnished intriguing perspective drawings showing a house nestled among trees.

"After the decision is made to construct a house in the woods, an interface is soon formed. Although its existence is rarely recognized by the newcomer, a distinct line separates the house area from the wildland. On one side of this imaginary line every possible effort is made to prevent fire, but on the other side of the same line, fire is an intimate part of the environment and a recurring boon to maintaining its natural balance..."

they wanted to be associated with, and most wanted to live with a great deal of room between them and their next neighbor.

Sometimes the appeal of rural areas is too great. James B. Davis, Research Forester with the Pacific Southwest Forest and Range Experiment Station, speaking at the Symposium and Workshop on Protecting People and Homes From Wildfire in the Interior West, explained: "Census information from the first half of the 1980s show that urban areas are growing again—but for different reasons. Areas that were once classified as rural are rapidly achieving sufficient population to be reclassified as urban. Typical areas are the Los Angeles Basin and the corridors between Boston and New York, and between New Jersey and Washington, D.C."

There are many reasons for these latest shifts.

- A supportive economy and more two-income families have given us additional discretionary funds to buy more vacation homes.
- Improved transportation allows us to live farther from the industrial centers, or from any job.
- The extension of convenient utilities to rural areas. More areas were seen as desirable after air conditioning became available, and telephones, and water systems.
- We have more leisure time. Company vacation time has increased, while the average number of hours worked per week has decreased.
- More of us can retire at an earlier age, and we often want a more sedate life-style. With private, funded pensions we no longer have to stay close to the immediate family.
- More of us have a general desire to be more self-reliant.

Each of these factors makes it easier to dream of a home away from the cities, away from the congestion and the conformity, the drab scenery, the high potential for crime, the air and water and noise pollution, the high costs of living.

We not only dreamed of homes in the woods, we bought them. Some were for primary residences, some were for secondary vacation homes, or for later retirement. But buy them we did.

Needless to say, this reverse migration to homes in the woods and other wildlands cause some drastic changes. Although homes in the woods and wildlands are aesthetically desirable, the fire problem resulting from this migration is made worse in at least three ways:

Increased frequency of fires

It is a common joke among statisticians that the top three causes of fires, whether in cities or in the wildlands, are men, women, and children. Indeed, people and their machines—whether intentionally, by carelessness, or from pure accident—cause 90 percent of wildland fires, and as more of them move to the wildlands, it is easy to see that the number of fires will increase.

The hazards are now bi-directional. The fires can burn from the wildlands into private homes and subdivisions, or they can start as what would previously be an isolated house fire and then burn into the wildland fuels and then quite often threaten or destroy other structures.

Increased severity of fires

The typical dream home in the woods often shares several dangerous factors. The uninformed homeowner seems to prefer a home that is private, has a scenic view, and is made of natural materials nestled among natural vegetation.

Privacy often means remote from public roads, or at least

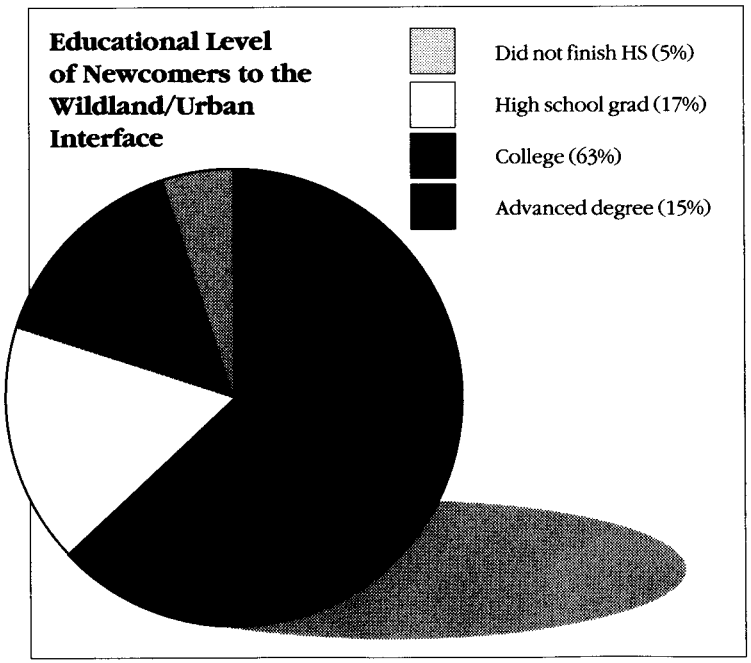
hidden behind narrow, curving driveways. The scenic view is often found along mountain ridges and valley slopes. Natural vegetation contributes to privacy and scenic beauty. It also provides a ready trail of fuel leading any fire right up to the combustible fuels of the home itself.

Increased difficulty for fire fighters

Higher population levels, even though spread out among the privacy of a wildland, has complicated the planning of forest fire agencies interested in preventing large fires. One method they use is prescribed burning, which is the controlled burning of accumulated brush to alleviate dangerous fuel buildup. But homeowners often try to prevent controlled burning to save the scenic beauty and avoid even temporary smoke conditions.

Scattered dwellings mean longer response times for fire fighters, so that all fires have a longer time to spread before being fought.

Take a look at but a single isolated rural community in Wisconsin, described by the fire chief as, "a fire protection nightmare." Its population has doubled since 1970. Many summer residents spend only a few weeks a year there, although a growing number of retirees have built homes in the woods or around lakes. The homes are typically of wood frame construction, many with wood shake shingles "for charm." Snow frequently makes for difficult access in winter.



As more people move to the forests and wildlands, an interesting thing happens. Increased demand for highly desirable rural lands has caused increased prices for the available acres. In response to this, the average lot size has become smaller and smaller. An unfortunate but inevitable result for those who were seeking rural solitude is that population density is on the increase.

Population density is not the only thing that comes to the urban/wildland interface, and these other things begin to affect the desirable beauty of the wildlands. One emerging problem is called "buckshot urbanization," which describes this evolution in the interface: a proliferation of homes along rural roadsides, followed by schools, commercial strips and factories.

People moving to rural areas want to leave behind as much of city life—such as high taxes for little-used services—as they can. But they seem to expect that one little-regarded part of their old life-style—fire protection—will automatically follow along to the new address, however remote.

This is, of course, an unreasonable expectation. Perhaps surprising is the educational level of the people moving to the wildland/urban interface and holding on to these unreasonable expectations: 78 percent in one study have attended college or achieved an advanced degree.

Why then can't these educated individuals see the hazards for themselves and choose to do something about them? It seems clear that striving for the dream home in the country results in a kind of tunnel vision, in which the fire problem is screened out.

The general public is not the only group known to harbor ignorance and misconceptions about this fire problem. Architects, contractors, developers, planning commissions and subdivision review committees often fail to consider fire safety.

Indeed these professionals often convey misleading and dangerous messages to the public that reinforce their lack of concern about fire issues. Their practices intentionally or unintentionally promote aesthetic concerns over fire safety concerns.

Typical dangerous messages include:

- Wood construction is visually more appealing.
- Architects should blend the structure into the wildland setting without disturbing natural slopes or vegetation.
- A structure needs maximum wood, glass and decks to take full advantage of natural scenic views. Adding to this message is the development of custom home designs and new building materials to allow development of land previously unbuildable because of steep slope, poor soils or restricted access.
- Subdivisions in the interface should be designed with a minimum clutter of roads, and with larger structures. Privacy takes precedence over emergency access.

These messages—when they are believed and implemented—become time-bombs. The problem, of course, is that the people who make statements such as the ones above do not have an understanding of the fire threat to combustible structures built too close to combustible forest and wildland fuels. And when a wildfire begins, those who gave the dangerous advice are not around to see the damage or learn the difficult lessons.

Fighting wildfires was tough enough even before the homes began to appear, nestled among the trees.

In attempting to suppress wildfires, the total fire intensity (the rate of heat output of the fire as a whole) must be considered. It is reached by multiplying the rate of fire spread, times the fuel loading, times the estimated heat yield per unit of fuel.

Perhaps this quote puts things in perspective: "The Malibu Fire raged with a force of 3.6 kilotons per minute, or one Hiroshima-type bomb every 5 1/2 minutes." Now add the necessity to protect wildland homes inside the perimeter, and it is easy to see that the fire fighter's world becomes even more complex and dangerous.

"Man does not extinguish a raging forest fire," begins an article originating from Garden Valley, Idaho, on August 20, 1986, and printed in the Philadelphia *Inquirer*. "Maybe he can contain it. Maybe he can control it. Maybe he can starve it. But when all that fails—as it did late Monday here in the Boise National Forest—he runs like the dickens.

" 'We were trying to set up a firebreak,' explained Craig Becker, a member of the Pennsylvania fire crew that flew here a week ago to help fight Idaho's rash of forest fires. ' Then the wind shifted. Everything blew apart,' said Becker, a resident of Hamburg, Berks County. 'Entire pine trees flared up like torches. Sparks were flying. There were just too many fires.' "

Forest and wildland fires have always been a special challenge to fire fighters, fought on a grand and terrifying scale although often fought in relative obscurity because of the remoteness of the fires from the watchful eyes of media.

If caught soon enough, the wildfires often can be handled by the first groups of local fire fighters who get the call. But some fires are so powerful, even in the earliest stages, that local forces are not enough. Then it takes a national network of men and women who can be ready to respond on short notice from Philadelphia, for example, when fire is spreading rapidly in Idaho.

This is an expensive proposition, bringing fire fighters from another part of the country, but consider the alternative when you know the possible devastation that can result from any one of the large wildland fires.

It is a system that has proven cost-effective in dealing with the large fires. But, increasingly, there is a complicating factor in the system of attempting to control wildfires. Where before there were forests to be protected in a time-proven manner, now there are homes in the forests. Richard Martin Stern, author of *Wildfire,* commenting on a forest's value, presented this important added thought:

"But aside from the Forest, there were the houses, the people who lived in them, the town itself, as vulnerable to destruction from wildfire as a village caught between artillery barrages and aircraft bombing."

Wildfires. House fires.

There is a big difference between them. This is the challenge for all types of fire protection officials.

continued on page 23

Wildland Fire Fighter Fatalities: A 10-Year Study

Of the total 1,278 fire fighter deaths in the United States during a ten-year period (1978-1987), 147, or 11.5 percent, occurred as a result of wildland fires. Of the fatalities that occurred during actual fire fighting, approximately 17 percent occurred in wildland fires. The sharp increase in 1987 prompted a special analysis on fatalities related to wildland fires by the Fire Analysis and Research Division of the National Fire Protection Association.

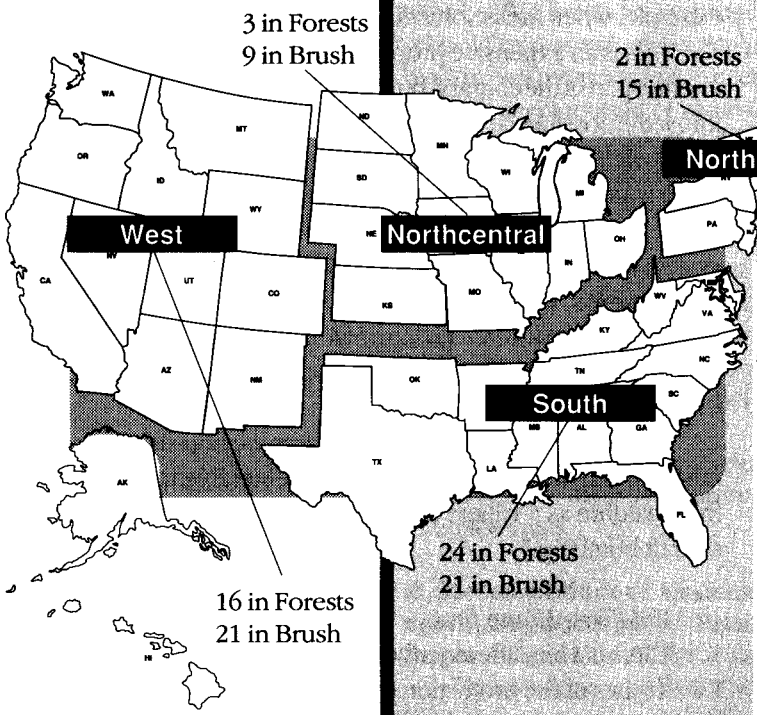
For the purposes of the analysis, the term "wildland" included forest, brush and grass fires. The 147 wildland deaths included 12 chief officers, 15 company officers and 120 fire fighters. Three of the victims were women, and the median age for all the fatalities was 42 years.

Three-quarters of the deaths (111) occurred during fire suppression activities. The largest proportion of deaths during fire suppression (40) were due to physical stress and exertion. Another 34 were killed from contact with or exposure to an object, as in an electrocution, or from being caught or trapped by the fire.

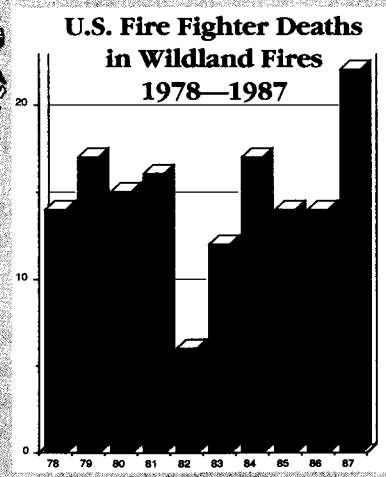
The remaining 36 deaths occurred when the fire fighters were responding or returning from wildland fires.

A clear difference was seen for municipal fire departments and wildland agencies. Heart attacks accounted for more than half the deaths of municipal fire fighters during suppression, while most of the deaths of state and federal wildland agency fire fighters were due to internal trauma and burns. Forestry officials believe that their rigid fitness requirements account for their low proportion of heart attack deaths.

Wildland Fire Ground Fatalities by Region, 1978—1987



U.S. Fire Fighter Deaths in Wildland Fires 1978—1987



U.S. Wildland Fire Fighter Fatalities by Nature of Fatal Injury 1978—1987

Fire Ground Deaths	Fed., State Wildland Agencies	Municipal Vol.	Municipal Career	Deaths While Responding/ Returning
Asphyxiation	4	0	2	1
Thermal Burns	12	5	2	0
Cardiac Arrest	5	31	7	6
Crushing	3	2	1	6
Drowning	0	1	0	0
Hemorrhaging, Bleeding	0	2	0	0
Internal Trauma	19	5	0	23
Electrical Shock	3	6	0	0
Heat Stroke	1	0	0	0
	47	52	12	36

Source: National Fire Protection Association

In most areas there are three types of fire protection agencies, and it is important for the public to understand the realities of service provided by each:

• Municipal fire departments, both career and volunteer. The city may be large or small, and very urban or predominantly suburban. These departments are funded by taxes paid by property owners inside the city limits. House fires are especially common, but these departments have no obligation to provide fire protection to property outside the city limits, unless there is a mutual-aid agreement with another fire agency.

Furthermore, an urban fire department may be prohibited from responding to calls from outside the city limits, due to economic liability or political reasons. Consequently, these fire fighters often are not trained to fight wildfires.

• Wildland agencies, both federal and state level. Their primary function is to prevent and extinguish forest and other wildland fires. They are generally not charged with responsibility for structure fires, and consequently are not equipped or trained to control them. Because of the immense areas covered and the remoteness of forests and wildlands, it may take as long as 30 minutes for them to respond to a fire, even in the high-priority fire season. They may be unable to do more than cool the ashes of a house fire in the woods. This is not a failure; house fires are beyond their intended scope, especially since these agencies are fully staffed only during the high-risk fire season.

• Rural fire districts. They stand between the previous types of fire protection. Some are well prepared for both wildland fires and house fires. But many are away from population centers and have long response times to fires throughout the rural region, although protection is available year-round. The lack of concentrated population may hinder these departments from acquiring specialized equipment and training for both types of fire fighting.

Generally, fire protection improves as population density increases. But population density is one of the main aspects of city life that cause an increasing migration away from the cities.

Wildfires. House fires.

More and more, they are occurring in the same emergency incident. The wildfire requires thinking on a large scale. The house fire requires focusing all thought and effort on a relatively small scale, although the owner of a fire-threatened home in the wildland does not think of his problem as small scale.

The flame front of a raging wildfire outclasses any equipment available to fire fighters today. Consequently, most of the fire suppression effort takes place a distance away from the flame front. Given the large scale of this type of fire, the fire fighters may actually be working a half mile or more away from the fire front. There is a reason for this special approach.

"Putting people close to the wall of flames," explained one Forest Service employee, "is a good way of getting somebody killed." Another experienced fire fighter adds, "You don't want to get at the head of the fire. It's too hot there. It moves too fast. It's too unpredictable."

Instead, the strategy is to build perimeter fire lines—areas from two to 30 feet wide that are cleared of all flammable material. Then smaller backfires are set to spread back toward the main fire, depriving the advancing flames of additional fuel.

The perimeter has to be large and flexible because the fire is reaching out so quickly, and the winds are subject to a sudden shift that could send the wall of flame racing in a new direction.

But a burning ember no bigger than your fingertip could result in the loss of a home and all of the possessions inside, both replaceable and irreplaceable. Obviously, if the destructive enemy can be that small— fingertip size—then the suppression effort must be concentrated.

This, in turn, requires more personnel per square foot of threatened area.

Specialized equipment is also required. Fire fighters attempting to suppress a wildfire use bulldozers and retardant-carrying aircraft and shovels and tools with strange names such as "pulaskis." They travel light to cover a lot of ground in a small amount of time.

Now, Al West, deputy director of the U. S. Forest Service, says, "Our fire fighting costs continue to climb because of the need for more equipment and personnel to save structures. Increasingly, fire commanders have to sacrifice control of the wildfire to defend buildings."

A house fire needs a different type of equipment from the wildfire. To extinguish a house fire, the fire fighters need a water

supply connected to hose lines. They also need breathing apparatus and other heavy protective gear to go in close to the fire. They don't use pulaskis, but they do use forcible entry tools and ladders. Then it takes specialized training to use the different equipment in a proper manner. Unfortunately, sufficient trained personnel and specialized equipment cannot always be provided both for the big scale of the wildfire and for the small scale of a threatened home. But usually a forest or wildland fire does not threaten single homes. Given the increase of residential development in the wildland, hundreds of homes are often threatened.

So what is a fire fighting official to do?

If he applies his available but limited resources to the rapidly spreading and larger wildfire, then individual homes cannot be properly protected.

If he applies a concentrated attack to save the lives and property of numerous threatened homeowners in the same forest or wildland, then the unchecked wildland fire devours more natural resources. And more homes.

There just isn't enough money around for everything that is needed. Meanwhile, urban and wildland fire departments are being strained by increasing protection demands. Unfortunately, there is resistance to requiring additional resources as part of any new land development. Available financial resources for fire agencies may be further restricted by such actions as California's Proposition 13 or failure of various fire protection bond issues.

The can-do attitude of fire fighters cannot fully compensate for inadequate resources in the face of increasing fire protection demands. One result of trying to handle increasingly frequent wildfires that threaten homes is that fire fighters are subject to more injuries. The risk is greater when fire fighters are attempting to operate in unfamiliar conditions, such as wildland fire fighters trying to extinguish a house fire or urban fire fighters operating in the wildlands adjacent to burning homes.

One solution to the problem of wildland or urban fire fighters who find themselves in fire situations that are not a normal part of their experience is to cross train and equip all fire fighters. This is a desirable goal, but the economic resources to do this on a national level are nowhere to be seen at the present time.

So what is a fire fighting official to do?

Common Denominators of Fire Behavior On Tragic and Near-Miss Forest Fires

1. Most of the incidents occurred on relatively small fires or isolated sectors of larger fires.
2. "Unexpected" or "unpredicted" winds were often given as the major cause of erratic fire behavior.
3. Most of the fires were innocent in appearance—in some cases the mop-up stage—prior to the flare-ups or blow-ups.
4. Flare-ups occurred in deceptively light fuels.
5. Fires ran uphill in natural chimneys, gullies or on steep slopes.
6. Suppression tools such as helicopters or air tankers can adversely modify fire behavior. Their winds have been known to cause flare-ups.
7. There are no "erratic" fire behavior situations. Our inability to predict fire behavior causes us to fall back on the term "erratic."

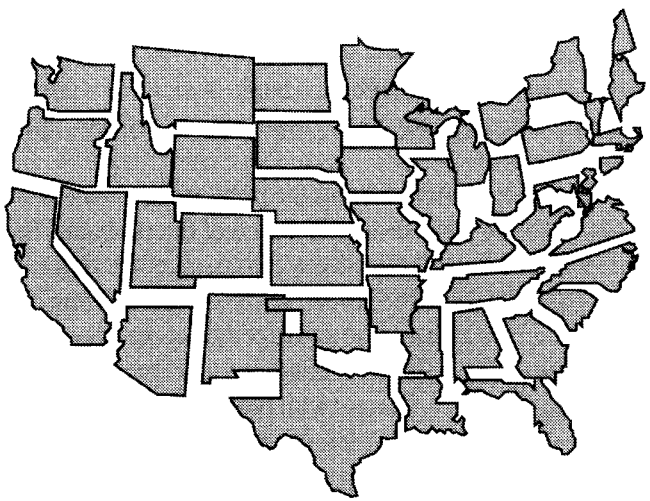
The homeowner in the flat Pine Barrens of New Jersey may not understand that he has one significant factor in common with a homeowner from the sloping chaparral of California: Both homes are surrounded by highly flammable vegetation.

We do have a national wildland/urban interface fire problem, but before we can begin focusing on the possible solutions we must realize the importance of local and regional differences, for the needed changes will be accomplished on these levels.

There are a tremendous number of regional differences in the wildland/urban interface fire problem, although we also correctly speak of this as a national problem.

It is indeed national because serious, recent losses of homes and lives have been reported from wildfires in Florida, North Carolina, Michigan, and Montana, as well as California, to name but a few states.

But when we look at the details of local experiences during the major wildfires, we quickly note significant differences—social, political, environmental—across the nation.



Although a national strategy and effective national leadership will be important in reducing this problem, the real battles and the real progress will be made within local communities, where critical regional differences can be understood and resolved.

James B. Davis, Research Forester with the Pacific Southwest Forest and Range Experiment Station, speaking at a wildland/urban interface conference, gave these examples:

- A ranger on a national forest in Michigan may view the [interface] problem as one of balancing the protection of the natural resources with the political expediancy of giving equal or better protection to summer and vacation homes for which the USDA Forest Service has no legal responsibility.
- A state forester in New Jersey may lose sleep over the suburban sprawl into the fire prone Pine Barrens. In addition, the forester may see the organization growing at a slower rate than the protection problem and feel the organization will soon be at a lower threshold of suppression effectiveness.
- A California fire chief may worry about large accumulations of flammable native vegetation, steep slopes, and narrow winding roads well within the boundaries of what most of us would consider a metropolitan area.

Davis added that not only are the vegetation and structural fuel problems variable and complex in these different interfaces, but the location and movement of people are different from one part of the nation to another, and population trends change rapidly over time.

Social and Cultural Differences

Social and cultural differences between regions and even smaller areas affect the wildland/urban interface fire problem in at least three aspects: legal, public perceptions, and residential patterns.

Legal attitudes The system of formal sanctions relative to the interface problem vary from region to region and jurisdiction to jurisdiction. These differences usually reflect the degree of public concern about the problem, which in turn probably reflects local experiences with residential fire losses in the wildlands.

The level of concern by planning and zoning authorities, commissions, local governments, and even special interest groups

is considered to be a subset of this aspect of regional differences.

Public Perceptions. Public perceptions, attitudes, customs, and behavior patterns relative to fire in general and in the interface areas vary significantly between and within regions. These differences apply not only to individuals and communities but also to groups, organizations, and other formal social entities, including the legislature system discussed above.

In short, the sociocultural environment within which a given urban/wildland interface "situation" exists has a tremendous influence on how that situation is defined.

An example is the more permissive attitude of some regions toward incendiary fires. In a typical year (1984) almost half of the reported wildfires in Alabama were classed as incendiary. In Mississippi 64 percent of the wildfires were incendiary. It has been explained that these are often not malicious fires set to intentionally destroy someone else's property, but were fires started for the purpose of clearing a person's own land of unwanted vegetation, often for agricultural reasons. The public perception here is that fire is merely a tool that has been used for generations in the same way. Neighboring lands were usually quite distant.

Of course, these fires become a public problem when they spread beyond the original property. And the population density in those areas is increasing.

Compare the Alabama and Mississippi figures with those of two nearby states. In North Carolina incendiary fires accounted for only 24 percent, and in Virginia only 11 percent. What is the difference? Is it education? Or legislation? Enforcement? Or all three? It is important that we better understand these perception differences, for they are the starting point for each region.

Residential Patterns. Residential patterns and practices in rural areas differ greatly from urban areas, but they also vary in rural areas from region to region. These patterns include construction proximity to flammable vegetation, value of new structures, preferred construction materials, and structure design. Local economic conditions will also have an effect.

In some areas, such as resorts, these residential patterns may be ostensibly planned by developers, while in other areas the pattern follows a "mushroom" or "buckshot" evolution, where houses just pop up but according to no particular overall plan.

Perceived property values or other values such as aesthetics and recreational activities may greatly affect residential patterns and their size and speed of development. As always, change carries consequences...or potential ones. A New Jersey fire warden, as reported at a major wildland/urban interface conference, predicts that should a fire situatiuon develop similar to the one that occurred in that state in 1963, structural fire loss could amount to 1,500 homes (compared to 400 homes in 1963), with damage in excess of 100 million dollars.

Legislative Differences

A second key problem identified was regional differences between jurisdictions of governments and local response agencies.

The difficulties were the capabilities of the local organizations, different educational and motivational levels of the public and agencies about the problem, and the different local philosophies of enforcement of laws and codes developed by the agencies.

For example, the capability of a local organization is affected by the policies of the organization, the suppression resources made available, the standards to which they are held, and the success of interagency communication.

James Davis notes the patchwork of regional differences, in which "some states have specific legal requirements for the protection of structures in the wildland. Others have no legal responsibility and neither train their personnel nor purchase the specialized equipment needed for structure protection. On the other hand, many agencies with thousands of acres of wildland within their jurisdictions may be unprepared to effectively fight a wildland fire."

Legislation theoretically follows the public will, but there are differences within regions about the nature of the problem. The general population that does not live within an interface area may not perceive the problem to be severe. And the persons living in a high-hazard interface area may be aware of the problem they face but then assume that the disaster will happen to someone else. At the same time, the agency charged with providing fire protection may consider the problem to be life-threatening.

Enforcement—or nonenforcement—of existing codes and

laws is a striking example of regional and local differences. This too can be traced back to the education and motivation of the public about the interface fire problem. The will of the public influences this enforcement level.

Even when an agency wishes to enforce existing codes and laws, limited personnel and budget allocations cause enforcement to be applied on a priority basis. In essence, public demands help set these priorities.

Environmental Differences

Vast differences exist in environmental characteristics throughout the United States as this applies to wildfires.

In order to address the issue of interface fire problems, the solutions or actions required will be much different for each specific area. These solutions, in order to be effective, should be collectively developed by the appropriate local officials, with consideration of the following:

Fuels. The vegetation within a given area which will carry and spread a wildland fire into homes and other structures in the area is an important factor. Regional differences in fuels vary from very light but fast-burning fuels (highly receptive to ignition) to heavy, dense fuels (less receptive to ignition) which burn slower but with greater intensity.

Topography. Topography varies from the flat, piney plains in the Southeast to the steep chaparrel-covered slopes in the West. Developments in the wildlands should consider the topographical characteristics involved and how they interact with these other factors.

Weather. Fire weather conditions bring the potential for any fuel or topographical situation to become an interface wildland fire disaster. But these different conditions cause the solutions to be very different from area to area.

The differences in weather patterns determine the frequency in interface disasters. In the west the problem occurs almost annually as extreme fire weather conditions are relatively ordinary. Thus the interface fire problem is more obvious.

In the Southeast, interface fire disasters are more subtle—though just as real—in that they are associated with infrequent but possibly extreme drought conditions. This makes the problem more difficult to deal with in terms of public and political awareness.

In any region fires can be small and slow burning or large and fast burning, depending on the makeup of fuels, topography, and weather.

Population Change by Region

A study of population change during one four-year period of the 1980s showed 19 states with nonmetropolitan areas growing at a faster rate than the metropolitan areas. Only in the South is the metroplitan population growing at a much faster rate than is the nonmetropolitan population. And even in the South the nonmetropolitan population itself increased in every state of the region. Nationally, nonmetropolitan population growth was reported in 45 of the 50 states.

The Stephan Bridge Road Fire:

Crawford County, Michigan • May 1990

Weather conditions during the first week of May across northern lower Michigan were right for a serious wildfire, and the fire fighters knew it: Temperatures were in the low 80s; relative humidity was 26%; and winds were out of the southwest at 17-21 m.p.h., with gusts to 42 m.p.h..

The area of northcentral lower Michigan around Grayling and Mio has a history of wildfires. The sandy soil doesn't hold the water very long, but Jack pines grow quite well. The topography is flat to gently rolling, with the Au Sable River running through the area near the fire origin.

At 3:40 p.m. on May 8, a fire was detected by a Michigan Department of Natural Resources (DNR) aircraft 14 miles east of Grayling in a heavy pine area. Several units responded at the same time, including an overhead team. At 3:53 p.m., the plane reported another fire a mile west of Stephan Bridge Road, ten miles west of the previous fire. A tractor plow was immediately dispatched to the Stephan Bridge Road fire. Personnel and equipment that had been on standby about three miles from the first fire origin were dispatched to that fire. However, before they reached the fire many were redirected to the more serious Stephan Bridge Road fire.

The first unit to arrive at the fire reported crown fire conditions with structures involved. Evacuation began immediately. Numerous agencies helped evacuate everyone in front of the fire. More than 300 people were evacuated during the fire. Many fire brands were being carried more than 1/4 mile in front of the fire, causing extensive spotting. By 4:45 p.m. the fire had jumped Stephan Bridge Road and the Au Sable River and was moving at two miles an hour. Several homes had already been lost. Many homes and cottages were located along the highway and dead-end roads. Evacuation was difficult as each residence had to be checked. At times people were leaving as the fire was igniting their outbuildings. The evacuation process was frightening and dangerous due to smoke, flying embers and the possibility of being trapped.

At 5:06 p.m. a third fire was reported nine miles south of the Stephan Bridge Road fire. Equipment and personnel were diverted to that fire. Homes and outbuildings were again threatened and several were lost. This also caused confusion with communications as these other two fires started west of and were jumping the Stephan Bridge Road. The third fire eventually burned 615 acres and took five homes and 15 outbuildings. Numerous cars, motorhomes and ATVs were also lost.

By 6:30 p.m. personnel and equipment were arriving from across the state. Fire departments were trying to protect structures as the fire advanced, but the intense heat and rapid spread of the fire made that impossible. They would pull out at the last minute, then come back in after the fire passed to save what they could. The fire departments had to evaluate each situation. Some structures could safely be defended, while others could not be saved or would put fire fighters in danger of being trapped.

By 7:15 p.m., the Stephan Bridge Road fire had jumped the Bald Hill Road. It was now over seven miles long and one mile wide. The fire had been burning out of control to the northeast for just over three hours.

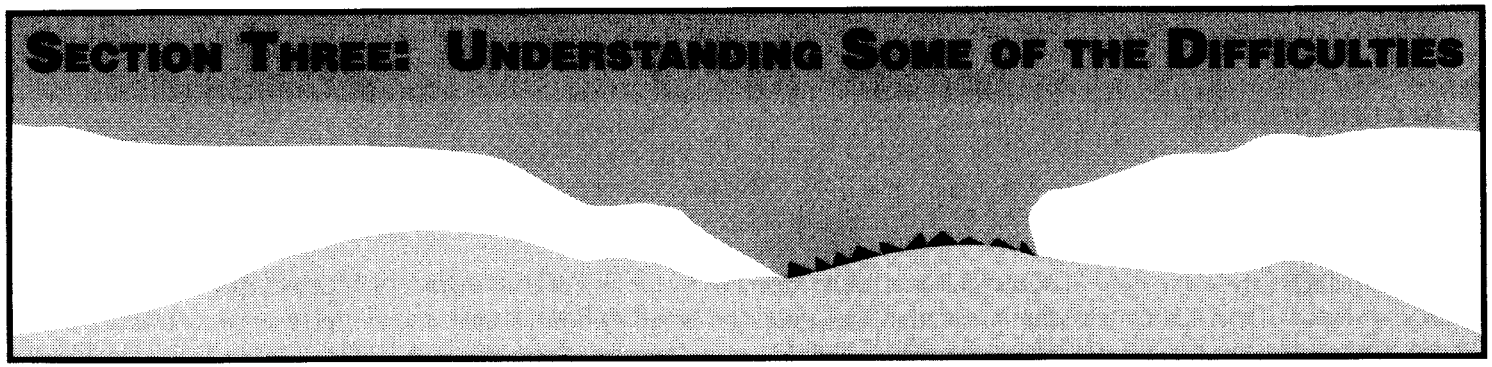
About 8:40 p.m. it started to rain enough to dampen the fuels and cool everything down a little. Darkness was setting in and the wind died down to just a breeze. Now personnel could get back in, check structures and start working along the flanks of the fire. Finally, progress was being made. Fire fighters tried hard to save what structures they could, while trying to avoid the downed and falling power lines.

Crews worked through the night to contain the fire before daylight. Power company crews worked through the night securing the lines that had fallen. By 7:00 a.m. the second day, fresh fire fighters were on the line completing the containment line, while fire department personnel checked structures and other outbuildings. Fire lines were completed late the second day and the fire was contained at 2200 hours.

The fire cause investigation team found the cause to be a land clearing (six weeks prior to the fire) brush pile that had been burned. The county prosecutor refused to issue a warrant.

This fire caused more loss of structures in Michigan than any fire since the late 1800s. A total of almost 6,000 acres burned, 86 residences were lost, along with 126 outbuildings and numerous vehicles, boats and camping trailers. The preliminary dollar loss was $5.5 million. ■

Section Three: Understanding Some of the Difficulties



In the original edition of *Wildfire Strikes Home!* published in January 1987, the middle section, "Understanding Some of the Difficulties," presented a frank discussion of the obstacles facing those who want to reduce the problems associated with interface areas. But there was also this acknowledgment addressed to the readers: "Who said it would be easy? Anyway, if you care enough to be reading this you probably are not the type of person to run away from a challenge."

The first task, and the hardest, is to get the public's attention. Every day thousands of messages—some important, some trivial, most in the middle—bombard the individuals and groups that need to know more about the potential problem of homes in the wildlands. It is not easy to sort out the messages and place them in the proper priority. This basic "distraction" truth about human nature must be understood and its effect considered before anything useful can be accomplished. Otherwise, efforts of the best intentions will fail, not because of the lack of importance of the effort but because of the lack of attention to the effort.

Another basic fact about getting the public's attention is that the public is made up of all kinds of people with all kinds of different interests. The approach that would get the attention of one group of people may be of no interest to another group. Clearly, each effort at creating more awareness of wildland/urban interface issues must be tailored for a specific set of goals.

In the commercial world, where profits are the motivation to increase public awareness of a particular product, market research is an important tool used to master the difficulties of selling that product. If the product is a new detergent, it is helpful to know what the public (or perhaps, more specifically, those individuals who do the shopping and buy detergents) like about a test sample and what they don't like. Armed with this information, the seller can increase the impact of the positive aspects and decrease the impact of the negative aspects. Fire agency officials, may be advised to consider a similar approach.

Fire agency officials are a varied lot, of course, and another difficulty arises when these officials create conflicts among themselves rather than fosters a sense of cooperation. This subject is addressed in the second chapter of this Section.

One of the stronger challenges for everyone working on wildland/urban interface issues will be the question of who pays for the problems... and the solutions.

The wildland/urban interface, then, represents some formidable difficulties to overcome. We all need to learn valuable lessons from whomever has the experience we need, whether it is from the commercial world, other fire agencies or homeowners themselves.

Fire officials are often frustrated by the lack of awareness of wildfire prevention and protection issues by homeowners and residents in interface areas, issues that must be of utmost importance to any conscientous adult.

Yet television and newspaper interviews with fire victims who have lost homes and possessions to some fast-spreading wildfire invariably include their admission that they didn't know the threat was so real, or that such a disaster could happen to them.

Fire agencies are not the only groups feeling frustration over public apathy when people are listening to dangerous messages or are seemingly not acting in their own best interests.

Dr. Robert DuPont, a Washington D.C. psychiatrist, became interested in attitudes toward risk after he noticed that a fear of flying is much more common than a fear of riding in an automobile—although automobiles are the leading cause of death for every age group up to age 40 (roughly 50,000 deaths per year on average), while perhaps 100 die on average in commercial aviation. Why, he wanted to know, didn't the fear match the actual risk?

And why, we might wonder, do homeowners in the interface fear tornadoes or hurricanes or economic collapse more that fires, which are a natural phenomena in the forests and cause more damage each year?

Dr. DuPont explained how even intelligent adults can have an improper attitude about risk. He said it was rooted in three common psychological perceptions—however irrational they may be—that govern risk assessment.

An individual will have a lower risk assessment when he thinks he controls the risk. A person may think he does have some control over keeping a fire away. For example, he may believe that the garden hose will be sufficient to keep his roof wet, but he may not understand that all of the water supply may be lost. That person may have a greater fear of tornadoes because they can in no way be controlled.

An individual will have a lower risk assessment *when the hazard frequently appears as small events,* as opposed to one big event. Most fires we hear about are small ones easily controlled. Most tornadoes or hurricanes are rarer events and almost always devastating. Over a year's time, wildfires may destroy hundreds of homes, yet this number is not focused in the homeowner's awareness. Big-event fires do occur, and this is the time when people may be more receptive to fire safety messages.

An individual will have a lower risk assessment *when the risk is familiar* than when it is unfamiliar. Fires are familiar, in camp fires, trash fires and fireplaces. The result is that the public perceives the risk of fire to be less than that of a distant, unfamiliar nuclear power plant.

If it is true that faulty perceptions screen out facts about risks, then fire protection agencies will need to consider these factors when designing programs to educate the public.

Despite the obstacles and frustrations, reaching out to the public is still the foundation of a solution to interface problems. A recent survey of California fire managers was described at a national conference. The survey assessed the research needs of the interface fire problem, and the highest priority for research was for an effective method to communicate with the public and, particularly, with public policy leaders before there was commitment to a course of land development that might be contrary to good fire protection.

Fire protection agencies are faced with several choices relating to the threat of fire in the wildland/urban interface. A basic choice is whether to take the initiative to attack the problem before it grows, or whether to wait for the public to recognize the problem and cooperate in its solution. When we have choices, we also have dilemmas.

Most fire officials want to aggressively attack the problem, yet funding is not always available. In a democratic society individuals and groups of the public at large have the freedom and the responsibility to make choices, even if they are made without complete information.

As the fire services confront the core dilemma and attempt to influence the choices made by others who affect the wildland/urban interface, it should not be surprising that there will be differences of opinion about possible solutions.

Major conflicts can be broken down into three major categories:

- The conflicting philosophies of preserving individual freedom versus regulation for community well-being. One speaker on a wildlland/urban interface conference panel, while discussing the need to gain community and public support to solve the interface fire problem, cautioned fire officials about establishing regulations without considering public choices. He added: "The perception of choice that an individual has directly relates to how much constructive communication there is going to be."
- Conflicts between special-interest groups, even among fire agencies if an atmosphere of interagency cooperation is not created and maintained. There is common agreement that complex problems can be solved best only when a broad base of interests work together. Fire protection agencies must not let conflicts among groups impede the progress that is possible through interagency cooperation. Nor can interagency conflicts be allowed to interfere. Among the suggestions for improved interagency cooperation are: Develop common standards and terminology; use a common emergency organization that all agencies understand and use it every day; establish methods to reimburse each other for services rendered; and create an interagency decision-making process to direct the operational procedures to be followed.
- The conflicting demands of fire protection agencies during a fire to protect lives and property versus protecting valuable natural resources. These conflicts are fundamental, and it is unrealistic to expect perfect solutions. However, the following points are suggested.

Identify and understand the conflict, including the motives for each participant's position and its role in creating or perpetuating the problem.

Minimize the existence of the conflict. Emphasizing the common interests of the parties can clear the atmosphere and keep the cooperative process moving.

Look for trade-offs and compromise as the key to solutions, with the goal of finding solutions that will benefit all parties.

Pass conflicts up to higher authorities for resolution only as a last alternative. Ideally the solution should be at the lowest possible level in the system. Higher levels of authority may represent solutions that are more removed from the local scene where impact is greatest.

We all pay, either directly or indirectly, when wildfires spread to damage or destroy homes in interface areas. Especially when a conflagration sweeps a large area—and must be fought by thousands of fire fighters—the total cost to the public is staggering.

The direct costs of those who lose their homes and their possessions are obvious. But less obvious are the indirect costs shared by the majority of "innocent bystanders" through insurance costs and rate hikes, taxes for fire-related services, and loss of public watershed and other wildland resources.

The reality of how we all pay for this problem has retained a low awareness because the cost breakdowns, and thus the individual responsibility, has remained dispersed, complex, and in many cases unidentified.

Also frustrating is the question of who should pay. Obviously the users of the fire protection services and those who buy insurance to cover fire losses in the interface should pay, but what about the responsibility of builders and developers and planners who set the stage for these fires that destroy homes.

Dr. Bob Lee, a professor at the University of Washington and a participant at the first national conference in Denver, has said, "We have to ask the question, who is responsible for solving this problem, and who pays? Our failure to define these responsibilities is at the very root of the problems... Local fire districts are going to have to be formed and the people who live there are going to have to pay the true costs of fire protection. They're going to have to similarly undertake those loss reduction tactics we've been talking about here. Look at the tradition of ranching communities in the West. They didn't have federal and state fire suppression forces. And they learned how to treat hazardous fuels, they learned how to [clear] around their barns and their fences and their homes, to use plows to create fire breaks to reduce risks. I think those same survival tactics will have to be learned by the people who live in the rural sector."

If who pays is to be the people who live in the wildlands, their ability to pay will be affected by their own reasons for moving to wildland areas. Although they may have many reasons in common for selecting a wildland/urban interface home, there are also many differences. Newcomers to interface areas may include seven categories:

- Commuters, more and more of whom are willing to travel long distances from wildland settings to jobs in urban areas.
- The retired, who may be more interested in leaving the crime and smog behind for a more peaceful home in the wildlands.
- Younger dropouts from the urban "rat race." Many of these with families want to raise children in a simpler life-style.
- Older, more successful corporate executives who may wish to exchange long hours spent in well-paying jobs for even longer hours spent launching their own small businesses in more peaceful areas.
- The poor, who may find that it is the only place they can afford to live. Their inexpensive homes may be less likely to incorporate fire safety construction features and maintenance.
- Those whose family backgrounds have traditionally involved rural living. They have always lived there.
- Those who continue to live in urban areas but who want a part-time or vacation home in the scenic wildlands.

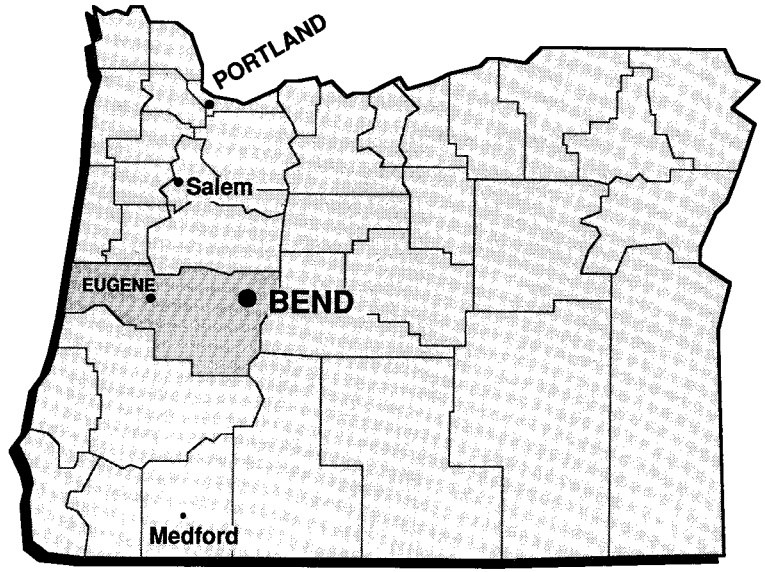
The debate on "who pays?" will continue in the years ahead, because change is a slow process. Meanwhile the answer to the central question will continue unchanged as well: We all pay.

The Awbrey Hall Fire:

Bend, Oregon • August 1990

A campfire escaped near Bend, Oregon on August 4, 1990 and grew into the worst wildfire in the area's history. Before fire fighters contained the fire, 22 homes were destroyed along with 3,350 acres. Homes in one of the subdivisions were worth up to $500,000. Almost 3,000 residents were evacuated. Fortunately, no one was killed or seriously injured by the fire.

This was another occurrence where extended high temperatures and low precipitation had parched the local forest and range lands. When the fire began to spread, it was rapid. Fire crews were on the scene within 20 minutes after receiving the alarm, although the first call was from a person unfamiliar with the location who saw smoke but did not know where it was coming from. A scouting fire fighter found the fire, which then covered 1 1/2 acres with flames leaping 50 feet high. Before his radio report was concluded, the fire had extended to two acres, crowning out in lodgepole pines and hot-burning manzanita trees.



Within 40 minutes after the first alarm the fire was uncontrollable by ground crews. Airplanes from the Redmond Air Center began dropping retardant on the fire within half an hour after the fire fighting effort began, a response that was praised by local fire officials.

Suppression forces eventually numbered 1,100 fire fighters plus nearly 500 support personnel, 122 fire engines, 70 bulldozers, 12 planes and 12 helicopters. Some fire crews came from as far as California and Washington to help with the operation. The fire cut a 12-mile-long path, chewing up most of the lost acreage in the first 12 hours, including an unusual night-time run. The incident commander said that they were "chasing as much fire at 2 a.m. as we normally do at 7 p.m."

Wood-shake roofs were a significant factor. Fire officials who inspected the area after the fire saw exactly what they expected: Houses with noncombustible roofs and lawns cleared of brush survived the flames. Houses with wood-shakes and little or no preventive landscaping were destroyed. An Oregon Department of Forestry spokesman said, "We've kept hammering at this, but people just didn't seem to listen: shake-roofed houses in the forest just don't cut it."

Therefore, wildland officials had to be frustrated when newspaper stories indicated that at least some reporters missed the important message about the effect of wood roofs. Said one article: "As the blaze cut a swath southwest of Bend, it seemingly picked its prey at random. In Sunrise Village, undamaged homes sit within yards of the ghostly, burned-out skeletons of destroyed residences." Another reporter indicated similar lack of understanding: "Also obvious was the randomness of the destruction."

One subdivision encouraged its residents to "use wooden shakes for roofing and to leave natural brush near houses as much as possible," according to newspaper reports. Of the homes destroyed, about half were in that subdivision. Only one of the homes destroyed by the fire had a noncombustible roof, and that house was under construction at the time, with exposed woodwork. A month before the fire the Oregon Department of Forestry again issued a warning that more than 9,000 homes were at risk. One of the homes that did burn belonged to the Bend police chief.

The loss of homes and acreage burned became the worst wildfire in Bend's history. ■

Section Four: Progress Toward Solutions—Examples of Local and National Activities

The examples that follow are evidence of the commitment and hard work that has been accomplished to reduce the wildland/urban interface fire problem. In the previous edition, the last section, titled "Getting Started on the Solutions," could only offer general direction, a few tips and much encouragement.

The original "Getting Started" material noted the varied and considerable experience of the early personnel who were aware of and working to address wildland/urban interface fire problems. The variety of experience of those individuals and others who began to work for solutions was perhaps a special advantage, because the introduction to the section acknowledged that there are no simple prescriptions or answers, adding that any individual on the local level can make a significant difference if an energetic and creative approach is taken.

That section also reported this caution: "One key factor, however, is for interested individuals and both local and national groups to join forces with each other so that the hard work ahead can be shared. As progress is made the glory will also be shared, but there will be more than enough for everyone who makes the effort." As can be seen in the examples showcased here, this strategy of interagency cooperation is a common theme.

The previous "Getting Started" section was composed of four chapters

- **The Need for Leadership.** This chapter began with the lament, "They oughta do something about this!" The response of a conscientious person would be to understand that "they" covers just about everyone. And just about every segment has contributed to the problem. Uninformed homeowners are the foundation of the problem, but many of them are placed at a disadvantage by profit-motivated developers and builders who do not want to spend money for fire protection, and who say they only do what the lawmakers allow. The fire services did not escape notice for the too-common attitude of being content to wait for the next fire.

"As in any effort, the uncoordinated attempts of separate individuals—no matter how committed—cannot be as effective as when proper leadership is also applied. This need for leadership is both local and national, and it is especially important because the problem crosses over so many traditional boundaries."

- **Research: Information Needs and Applications.** How could concerned leaders define the interface problems for others if they could not say, for example, how many homes are lost to fires in the interface in a given year? This type of information relies on the combined work of national, state and local organizations. The first edition reported that the USDA Forest Service supports the largest, most comprehensive wildland fire research program in existence. The quantity and comprehensive nature of its research makes it unsuitable for detailed coverage in this second edition.

According to the first edition, "Good leadership is able to be more effective when it stands on a good foundation of knowledge. Researchers have offered much useful data, but they acknowledge that much more study needs to be done."

• **Generating Public Awareness and Motivation.** This was called "clearly the most important task... The public must first be shown how the problem affects them individually, even if they don't now live in an interface area." In comments from an address at the National Fire Protection Association 1986 Fall Meeting, USDA Forest Service Chief Max Peterson said, "Looking at the year 2000 and beyond, I believe we will see computer and communications technology allowing more and more people to work at home. And they will seek the amenities which are typical of the wildland/urban interfaces." This is only one of many acknowledged trends drawing more people away from urban areas.

To reach the wide range of people who are "the public," extensive and intensive media campaigns were called for, both at the national level and the local level. The first edition noted, "This national effort should not, nor would it, overshadow the value of and need for regional and local informational campaigns. The national campaign should perhaps be considered an introduction to the public, with the real educational and motivational information being discussed by regional task groups."

Beyond the affected homeowners, three other key publics need to be targeted; *opinion-makers,* who influence what people hear about and think about; *legitimizers,* highly respected leaders of a community or of smaller groups who have the power to influence broader reactions to issues; and *decision-makers,* who take the official actions after the others raise an issue and take their positions.

• **Designing Fire-Safe Homes in the Wildlands.** There was a call for a better effort here, "so we can enjoy the advantages of a special life-style." The first edition acknowledged that when a big fire starts in the wildlands, even the pooling of fire control resources may result in the old story of "too little, too late." A better way, fire officials knew, was to provide proper home designs and development planning to help prevent the fires from sweeping through interface areas.

In the time since the publication of the first edition, many individuals and organizations took up the challenge, although the particular details of one successful program were not always known by others in different regions of this country and Canada. The interest and effort to share that information led to this second edition.

In a letter to the growing list of personnel involved with wildland/urban interface issues, Deputy Chief Allan J. West, USDA Forest Service, asked for examples of materials and activities undertaken since the first national conference:

"Since the first national conference dealing with the Wildland/Urban Interface issue was held during September 1986 in Denver, several program spin-offs and solutions have been initiated. The publication *Wildfire Strikes Home! First Edition,* printed and distributed in early 1987, set the stage for:

1. Definition of the problem.
2. Understanding some of the difficulties.
3. Getting started with solutions.

"Accomplishments after the Denver workshop were varied and widespread. These include but are not limited to: localized regional workshops involving cooperators as well as legislative personnel; fire-prone property surveys and brochures; specific fire-safe legislation; various publications; checklists; and development of planning and zoning models, as well as fine-tuning partnership agreements, to name a few.

"Even more gratifying is the interest in fire protection demonstrated from people and organizations traditionally not part of the fire community, which has strengthened our programs and broadened the base.

"As current supplies of *Wildfire Strikes Home! First Edition* have been almost exhausted, it is appropriate to update this publication with a focus on solutions at the local level as established in the original charter of the Wildland Urban Interface Initiative. To accomplish this task with the best possible product and guidance we are requesting your assistance in providing examples of programs, documents and other activities relating to fire protection in the interface."

Other organizations, including the National Association of State Foresters, the National Fire Protection Association and the United States Department of the Interior, also distributed similar calls for information. The responses to the requests were impressive.

LOCAL AND NATIONAL ACTIVITIES BY CATEGORY

HOW TO GET MORE INFORMATION ON A SPECIFIC EXAMPLE

■ **Building Interagency Cooperation (85)**

An index number follows the title of each activity example described on the following pages. More than 100 items were submitted. The number was assigned in ascending order generally according to when the item was received or processed.

Categories were later used to divide the examples into similar groups. The categories were an arbitrary grouping for the convenience of the editor and to produce generally equal-size categories. The examples within a category were then arranged in numerical order, with no other criteria.

Each categorized example was necessarily capsulized to fit in the available space. It is understood that readers may be motivated to seek more information about specific examples that might be adapted by another organization for local use. To facilitate this follow-up, an Index of Examples follows this Section on page 76. Contact persons, addresses and phone numbers—as were available—are listed for each example. Simply note the index number for a particular example and reference that number in the Index of Examples.

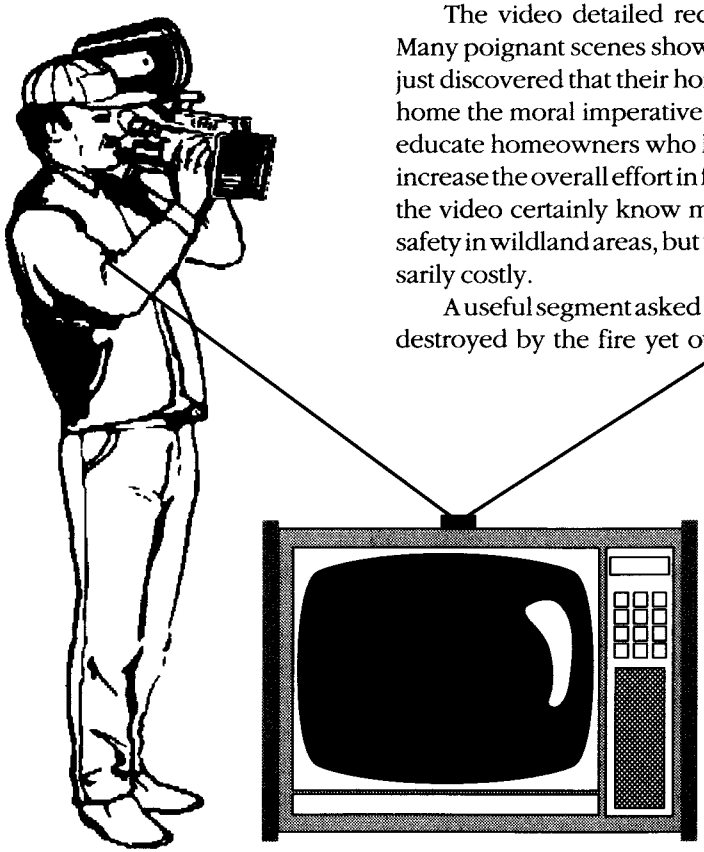
Disclaimer: The list of activities and publications beginning on the next page is not offered as a complete overview of everything being done by federal, regional, state and local organizations. Rather, this compilation is intended only to report on those who responded to the letter request for information about any such activities, and to provide examples of the types of programs developed in response to the Wildland/Urban Interface Fire Protection Initiative in the United States and Canada.

■ Wildfire Hits Home (1)

Developed by the Washington State Department of Natural Resources, this video provides a professionally produced overview of wildland/urban interface problems in the state.

More than half of Washington is covered by forest, and 39 percent of the population growth since 1970 has been in wildland and rural areas. The usual equation will once again prove itself over time: More people = more fires. In 1988, at least, it seemed true. That year was the third-worst year in the past 30 years.

The video detailed recent wildfires that affected homes. Many poignant scenes showed shocked homeowners who had just discovered that their homes were lost in a wildfire. It drives home the moral imperative for fire agencies to work harder to educate homeowners who live at risk in interface areas, and to increase the overall effort in fire prevention. The homeowners in the video certainly know more than before the fire about fire safety in wildland areas, but their lessons learned were unnecessarily costly.



A useful segment asked the question why some homes were destroyed by the fire yet others survived. Easy-to-understand explanations followed, and even a distracted homeowner would be motivated to pay attention to the message being presented and heed the warnings. Many self-defense factors were described, including the selection and maintenance of roofs. The appalling record of untreated wood-shingle roofs was evident.

Recommendations for avoiding future interface conflagration tragedies were discussed in four categories: building code changes, including prohibiting untreated wood-shingle roofs; creating and maintaining defensible space around all structures; providing for adequate water supplies; and providing for adequate fire vehicle access in case of emergency.

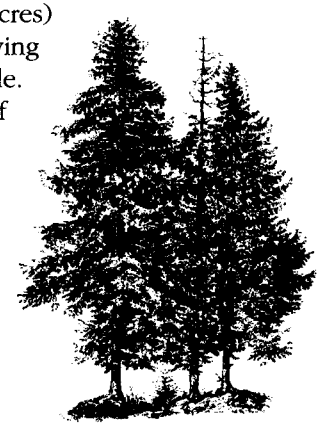
At the end of the video, to make it easier for interested persons to follow-up for more information, a toll-free telephone number was provided.

■ Dream Home (2)

The New Jersey Pine Barrens—here is another of those lovely places where a visitor or homeowner can enjoy so many of the pleasures of nature, yet the area is within an easy daily commute to Philadelphia and Atlantic City. It is also an area of natural vegetation that "burns like gasoline."

This video was produced by the State of New Jersey in conjunction with television station WPVI in Philadelphia, and the result is another benefit of interagency cooperation. The television people provided the high-quality video production features that command attention among all types of audiences, and the Division of Parks and Forestry people provided the right technical content.

New Jersey is remembered for its 1963 Pine Barrens Fire, in which 4 percent of the state (190,000 acres) burned in a single weekend, destroying 400 structures and killing seven people. The video described the buildup of forest fuels and litter since that fire cleared so much available fuel. The video also showed the buildup of dwellings in the area since the fire. Although the fire is well known by wildland fire agency personnel, many new residents apparently are much less informed about the prior tragedy and the lessons learned from it.



VIDEOTAPES

When another fire occurs, fire personnel know that—considering the type and arrangement of the vegetation in the area—the only reasonable defense is to position one fire engine and crew for each threatened home. Of course, that quantity of fire apparatus will never be available in the time period needed to stop a fast-spreading fire.

■ Wildfire '87: Decisionpoint for the Future (3)

This 21-minute video was part of a national satellite broadcast offering a broad overview of the wildland/urban interface fire problem. It was professionally produced by the National Fire Protection Association and other sponsoring organizations of the National Wildland/Urban Interface Fire Protection Initiative.

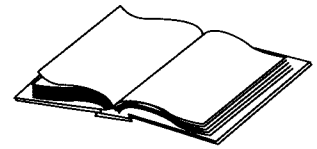
After giving highlights of the 1985 and 1986 fire seasons, which due to their severity helped make many more people aware of this issue, the video presented the toll of 1987. In that year, more than 2,000,000 acres burned, 690 homes and other structures were destroyed, 25,000 fire fighters were mobilized from every state in the country, 2,000 of them were injured, and 12 died while attempting to suppress the fires.

■ A Special Place, A Special Peril: Inspection of Fire-Prone Property (4), Your Way to Help (5), Wildfire! Are You Prepared for its Deadly Force? (75)

The Michigan Interagency Wildfire Prevention Group produced this video message in two forms. The first, *A Special Place, A Special Peril: An Inspection of Fire-Prone Property,* is designed to communicate with the general public. It features a warning of the fire dangers associated with the typical pine forests found in Michigan. Then a video checklist of fire safety considerations for wildland/urban interface homes is presented. Effective time is spent describing the concept of defensible space around homes.

This is a relatively inexpensive example of using the impact of a video format. The announcers are not professional speakers but are working personnel from federal, state and local fire agencies: specifically the Hiawatha National Forest, Michigan Department of Natural Resources and Negaunee Township Fire Department.

In its second form and titled, *A Special Place, A Special Peril: Your Way to Help,* the video is designed as an overview for fire agency personnel before they go out in the field to conduct educational sessions with the public using the first video version.



To accompany the video when it is presented to public gatherings, the Michigan Interagency Wildfire Prevention Group also prepared a printed version of the 19-item property inspection checklist. It is titled *Wildfire! Are You Prepared for its Deadly Force?* The four-page, 5 1/2 by 8 1/2-inch brochure provides space to record important phone numbers to report a forest fire, call the local fire department or call to obtain a burn permit or get more information.

■ Draft Video Story Board (6)

For development and production of a 10-15 minute video documentary on the wildland/urban interface fire problem in the Midwest states of Indiana, Illinois, Iowa and Missouri

This proposed but not yet produced video would be targeted at planning boards, developers, homeowners and local fire protection agencies. Its goal would be to promote firesafe planning in wildland/urban interface areas, including consideration of access layout and standards, vegetation management and maintenance, water supplies and building construction standards.

The story board serves as a planning tool to lay out the scenes and messages to be presented in the time allotted. It separates the overall subject matter into related segments and details the order of presentation. The draft was produced by Pete Skuba of the Illinois Division of Forest Resources.

After setting the scene of comparing and contrasting the wildland and the urban styles of living, the video would devote several minutes to showing scenes where the wildland and urban areas meet, sometimes with disastrous results when fire safety is not considered. Dramatic existing footage would be selected to define the problem to the viewers in such a way that their attention would be grabbed so they would want to see what can be done to resolve the problem.

Tips for developers and other targeted viewer segments would be offered. Finally, a safety checklist for homeowners would be described.

Throughout, the message is reinforced that if wildland/urban interface problems are addressed early on by all parties, the meeting of wildland and urban areas can have a happy ending.

■ Building Interagency Cooperation (85)

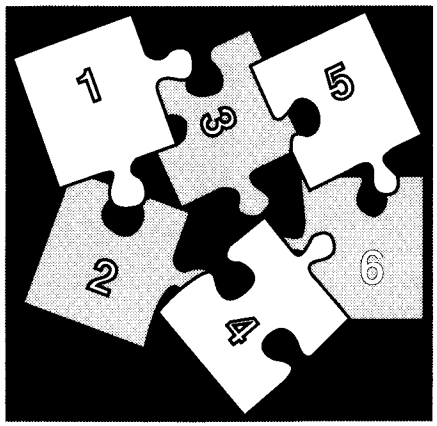
This video—produced by the National Fire Protection Association through the National Wildland/Urban Interface Fire Protection Initiative—addresses the need for different agencies to be able to work together to control large wildfires and to prevent them. When the major wildfire is spreading toward homes and valuable resources, it is too late to work out the details of effective communications and coordination of forces. One person in the video described this problem: "I watched a building burn 100 yards away from me because I couldn't communicate with the people and equipment that weren't a part of my department."

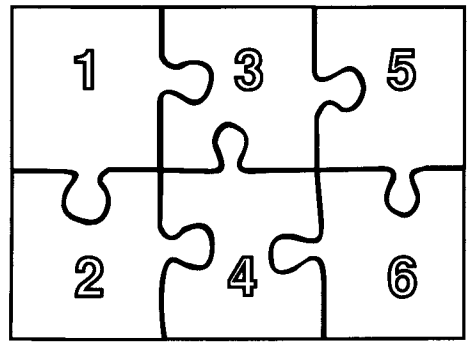
The video presents a six-step process to help improve these communications and coordination needs before the fire:

- Obtain commitment
- Examine your problems
- Set goals and objectives
- Develop programs and policies
- Approve and implement the plan
- Evaluate and revise the program as needed

A 30-page illustrated document was also produced to accompany the video. It was intended for use by local fire agencies to further develop local interagency cooperation programs dealing with the interface problem, and 20,000 copies were printed.

Additional tips were given to help cooperative efforts get a better fit, including, "To cooperate, you don't have to give up your organizational identity or procedure." And this: "The time to start is now. Don't put it off."





Interagency cooperation: How to make the pieces of the puzzle fit together smoothly for improved effectiveness.

Appendix material featured a sample cooperative agreement and a *Fire Command* magazine article reprint titled, "Cooperative Programs: Start with the Basics." It also had six tips:

- Keep the development process at the lowest possible level.
- Involve a variety of ranks.
- Don't limit your scope.
- Have a name, leadership and a mission.
- Use working groups, get everyone involved.
- Develop group projects.

■ Protecting Your Home From Wildfire (86)

As another video sponsored by the National Fire Protection Association through the Initiative, it was intended for fire agencies to use in getting the fire safety message out to the public. It demonstrated three general steps that homeowners could take in designing their homes to make them safer from wildfire:

- Choose a fire-safe location. Details included consideration for slope, vehicle access and location marking.
- Design and build fire-safe structures. Details included warnings about wood shingle roofs, and preventing sparks jumping from chimneys to vegetation or from burning vegetation to chimneys.
- Stay on guard with fire-safe landscaping and maintenance. Details included creating a safety zone of cleared vegetation, storing combustibles away from the home and avoiding outdoor incinerators.

This video also had a companion printed document supplementing the message. Used as a handout (20,000 copies were printed) in fire safety presentations to the public, the document provided a device for generating discussion about the steps to take.

■ International Satellite Broadcast (87)

Three of the videos above, Wildfire 1987, Building Interagency Cooperation and Protecting Your Home Against Wildfire were combined into a single production for a special satellite broadcast on April 20, 1988. The goal of the sponsors was to provide an overview of the wildland/urban interface fire problem and general guidance for the actions that fire fighting

agencies, design professionals and homeowners can use to reduce the potential for disaster. A combined videotape of the broadcast is available from the Initiative sponsors or through the Publication Management System at the Boise Interagency Fire Center (see special ordering note in the Index of Examples).

■ Fire Fighter Safety in Wildland/Urban Interface Fires (90)

This is another video produced by the National Fire Protection Association and sponsored by the Initiative. The video looked at some of the reasons for injuries to fire fighters and suggested that, "The most direct ways to improve the safety of both structural and wildland fire fighters is through cross-training of all fire fighters and improved equipment."

Personal safety concerns were discussed under three areas:

- The fire fighter individually, including physical fitness and personal equipment.
- The area immediately surrounding the fire fighter, including the effect of structures in wildland fires and the effect of terrain.
- The overall environment of the fire itself, including weather and spreading factors.

Another section discussed the 18 situations that shout "Watch out!" They make up a wildland fire fighter's survival checklist. The ten standard fire fighting orders were also presented and discussed.

As with the other NFPA-produced videos in this section, a companion document was printed to serve as a ready reference to reinforce the safety message of the video. Additional material in the document discussed wildland fire fatalities over a ten-year period, which was excerpted from Analysis Report on Fire Fighter Fatalities, prepared by the Fire Analysis and Research Division of NFPA. A magazine article reprinted in the document featured a report of the Butte Fire in Idaho, in which 73 fire fighters were trapped and narrowly escaped death thanks to their personal fire shelters.

The video and publication are also available from the Initiative sponsors and from the Publication Management System at the Boise Interagency Fire Center (see special ordering note in the Index of Examples).

■ Protecting People and Homes From Wildfire in the Interior West (12)

This 1987 conference was directed at residents of California, Oregon, Washington, Idaho, Nevada, New Mexico, Arizona, Colorado, Wyoming, and Utah. It had four purposes:

- To examine the problems of protecting wildland homes from fire.
- To reveal the threat of wildfire damage to life and property and the high cost to every taxpayer through higher taxes and insurance rates.
- To present state-of-the-art approaches to the home-wildfire problem.
- To develop resources for homeowners, government agencies, fire personnel, and the business community to help solve the home-wildfire problems in the Interior West.

Ironically, the spectacular 1987 fire season in the West threatened both the attendance and the success of this conference, but nevertheless some 500 were able to attend.

One of the significant messages from the conference was that fire management was affected by these realities:

- Fire is a natural process, which for thousands of years has reduced fuels and regenerated forest, shrub land, and grassland vegetation.
- Human ability to suppress damaging fires remains quite limited.
- Human attempts to exclude fire often result long term in more damaging fires than would have occurred otherwise.
- But people *can* manipulate fuels to minimize damage from unwanted fire.

The conference featured 53 presentations, panel discussions, and workshops, plus a display of posters. One example of the presentation was "How to Communicate the Wildland Fire Problem to Political Leaders and Homeowners." Afterwards, the conference organizers published a 200-page proceedings.

■ Wildland/Urban Interface Workshop, Bend, Oregon (13)

In September 1988, an Interagency Wildland Urban Interface Workshop was held in Bend, Oregon. The workshop was attended by approximately 75 people representing city and county government, insurance industries, builders, developers, homeowners and the forest industry. The objectives of the workshop were:

- Define specific steps that can be taken by lawmakers, fire services, planners, developers, other professionals and homeowners.
- Integrate recommendations of workshop participants into mutually acceptable and workable solutions to prevent the loss of life and property associated with wildland urban interface fires.
- Equip participants with information and assistance required to initiate solutions at the local, state and regional levels.
- Enhance community awareness of wildland urban interface fire potential.

■ Interagency Wildland Prevention Conference, Lincoln City, Oregon (14)

In February 1989, an Interagency Wildland Fire Prevention Conference was held in Lincoln City, Oregon. This conference was attended by 110 people from state, federal and private fire organizations. The objectives of the conference were:

- Develop sample action plans with solutions that address wildland urban interface problems encountered in the Pacific Northwest Region.

- Share concerns expressed by the Bend, Oregon Workshop participants.
- Introduce participants to a five-step process that can be utilized to identify and develop solutions for wildland urban interface problems.
- Provide a forum for the various agencies and other fire organizations to share information on how they are addressing the wildland urban interface problems.

■ Interagency Wildland Prevention Conference, Seattle, Washington (15)

In June 1989, another Interagency Wildfire Conference was held in Seattle, Washington. The conference was attended by approximately 270 people from county, state and federal fire organizations, as well as planners, developers and state government representatives. The objectives of the conference were:

- Provide an opportunity for various organizations and individuals to meet one another.
- Enhance the cooperation of interagency and other interested parties on the urban interface issue.

■ Protecting People and Homes from Wildfires in the Black Hills (South Dakota) (16)

This April 1989 conference was designed for professional and volunteer fire fighters, county commissioners, county sheriffs, municipal officials, elected officials, health department officials, developers, realtors, homeowners association officials, residents and others special interest groups.

The conference was sponsored by the South Dakota Division of Forestry, Keep South Dakota Green, U.S. Forest Service Black Hills National Forest, Weston County Firefighters Association, Wyoming State Forestry Division. The conference was partially funded by a grant from the U.S. Fire Administration through the National Community Volunteer Fire Prevention Program.

■ Up In Smoke: Wildfire Strikes Home in Georgia (17)

A broad range of sponsors in Georgia combined their diverse interests to co-sponsor six 1989 workshops presenting case histories of Georgia fires and tips on protecting homes in the urban/wildland interface.

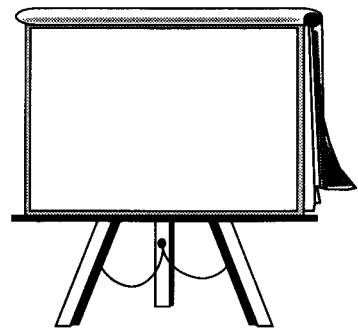
Workshop promotional material stated, "Yes, wildfires are not just limited to the forests of California, Florida, Texas and other states. They can destroy you, your loved ones, your home, your land, and your dreams...right here in Georgia."

The 1989 sites included Macon, Augusta, Rome, Brunswick, Gainesville, and Thomasville. Sponsors of the workshops were Georgia Forestry Commission, Georgia Firemens Association, Georgia Association of Fire Chiefs, Georgia Fire Academy, U.S. Forest Service, American Forest Council, Walt Heiss (homeowner), Georgia Forestry Association, and University of Georgia Extension Forest Resources.

■ Fire Safe California Workshops: Survival by Design (19)

This two-day workshop was conducted in two locations in March 1988 by the sponsors: California Department of Forestry and Fire Protection, U.S. Forest Service Region 5, Cal State University - Chico, and Cal Poly Pomona.

The workshops looked at a national overview of the wildland/urban interface problem and at the California perspective. Day 1 included a field trip to an actual interface area. Day 2 included defensible space concepts and tips. Two breakout sessions featured nominal group techniques and idea writing.



Two specific purposes of the workshop were:

- To work with and influence social networks, recognizing that groups are linked to each other by common communications and influence. Organizers invited community opinion leaders who can influence the attitudes of others.
- To influence the survivability of defensible lands and neighborhoods, recognizing that the typical wildfire threat is to an entire neighborhood.

After the workshops, organizers also sent an evaluation form and questionnaire to attendees, asking among other things, "Who else should have been here?" to identify for future workshops who could have provided useful input or benefited from the intended message. Another question was "What would encourage developers to incorporate defensible space into their developments?"

According to the workshop promotional material, "Losses to wildfire in the wildland/urban interface can only be reduced if we take action to create 'defensible space' that is attractive to people who should adopt it."

Defensible space was defined as an area around the perimeter of structures and developments in the wildlands that is a key point of defense/attack against encroaching wildfires or escaping structure fires. Such areas are characterized by adequate emergency equipment access, visible street identification and building numbering, adequate emergency water reserves, greenbelt fuelbreaks, as well as clearance of flammable vegetation around structures.

■ Governor's Conference on Rural/Suburban Fire Protection in Texas (23)

More than 90 participants attended a Wildfire Strikes Home in Texas conference in Austin in 1988 to review the many fire-related problems facing the rural and suburban areas of Texas. The problems were acknowledged to be complex, but the participants were able to reach consensus on the six most pressing issues.

Municipal and urban areas were said to have generally adequate fire protection. However, reports from the State Fire Marshal show that rural areas experience generally 40 percent per capita greater losses of life and property than that which occurs in protected urban areas.

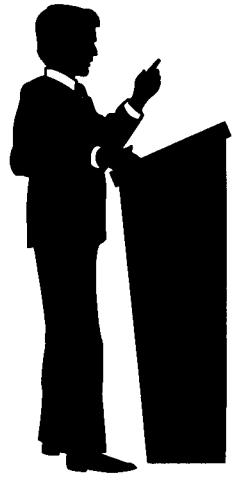
A formal report of the fire situation in Texas and an agreed course of dealing with the problems was published in a formal report on the conference. That report is described in the "Reports" chapter elsewhere in this section.

■ Rogue Valley Fire Prevention Cooperative Town Meetings (83)

Following a severe wildfire episode in southwestern Oregon in the fall of 1987, the Rogue Valley Fire Prevention Cooperative renewed efforts to address fire in the wildland/urban interface. The co-op designed a Fire Prevention Town Meeting process as a first step.

The main objectives of the Town Meetings are to determine residents' perceptions and needs relating to fire prevention and to help the residents accept their role and responsibilities in dealing with fire in the interface.

The meeting format starts with the hosting fire agency



introducing the meeting moderator, who is from the co-op. After a brief introduction to the co-op the moderator shows a videotape about the 1987 southwestern Oregon fires. A guest speaker briefly defines the wildland/urban interface fire problem and some fire loss preventative measures residents can take in a wildfire situation. The emphasis is on preventing or mitigating loss in a fire situation. The co-op developed a series of eight fact sheets around a theme of "Give Your Home a Fighting Chance." These cover various preventative measures to be taken by interface residents and are made available at the end of the meeting.

Next the audience is broken into small groups of 6 to 8 people each. Co-op members are trained in and use small group facilitation techniques to illicit responses from all group members and keep discussions on track. The groups were asked three questions: "What do you feel the problems are and how do they affect you?" "What are *you* willing to do to solve the problems?" "What can we do together (fire services and residents) to solve the problems?"

When small groups finish, the audience is brought together to share all responses. Many meeting attendees have remarked they supported the meeting format and really appreciated the chance to have their input considered.

At the end, attendees sign the guest book to get on the mailing list for future newsletters being sent out on fire prevention in the interface.

The entire meeting usually runs 2 to 2 1/2 hours. At the end the moderator runs the *Wildfire Strikes Home* video.

■ International Conference: Meeting Global Wildland Fire Challenges (91)

Boston, Massachusetts was the site of the first international wildfire conference of its type on July 23-26, 1989. More than 400 participants from 34 countries attended. Explaining the need for an international conference, Alan West, Deputy Chief, U.S. Forest Service, said: "During the past decade, wildfires have caused major losses of life, property and natural resources in Africa, North and South America, the Mediterranean, Australia and parts

of Europe." West added that the global nature of this problem requires international attention.

The conference was sponsored by six organizations from Canada, Mexico and the United States. There were three main goals for attendees:

- Proposing measures to prevent, control and reduce the effects of wildfires.
- Sharing fire prevention and fire management techniques and suppression strategies.
- Encouraging international communication and increasing mutual cooperation among nations.

The registration activities included a visit to the 100 international educational displays, featuring a wide variety of topics.

The first full day of the conference focused on giving the participants a global perspective of wildfire through reports from six regions of the globe. Economic and resource perspectives came first, with the afternoon devoted to biological and physical aspects.

International cooperation was in the spotlight for the second full day. A preconference survey of international wildland fire managers in each of the six global regions showed that international cooperation was a problem in managing and dealing with wildland fire. For this reason a special working lunch explored what opportunities existed for increasing international cooperation, as well as the barriers in the way. Speaker sessions addressed the social, political and economic factors of decision-making and their effects on wildland fire management. Case examples of successful international cooperation were presented.

A panel discussion on the third day analyzed why programs succeed in terms of disaster management, training and technology. Then wrap-up sessions summarized the material presented during the conference and placed each topic in an operative framework for future actions. Before leaving, each participant received a printed 40-page report of the preconference survey and on the results of the working lunch. A 100-page proceedings will also be published.

In a final message, Alan West said, "It is fitting to reflect on the successes of the conference, but that reflection must extend beyond our efforts here in Boston. Each of us must look at our program and efforts to identify our successes and build upon them. This Conference is simply a beginning for the tasks ahead in forging our international fire community. There is much to do in the areas of information and technology transfer, training, and the sharing of resources. From this beginning , anything is possible. It all depends on us."

■ Wildland/Urban Fire Interface Workshop for Social Scientists (97)

A group of sociologists, psychologists, economists and others met in Asheville, North Carolina in April 1987 to learn more about the "people" factors of the interface fire problem. Participants represented state and federal agencies, universities, and special and private interests. The meeting was sponsored by the U.S. Forest Service and the National Fire Protection Research Foundation.

Issues were identified and discussed. Participants selected issues that were of interest to them and were encouraged to form groups that had a mix of expertise. These groups generated 12 projects according to a prescribed format. The projects fell into four categories:

- Quantifying the problem.
- Institutional, legal and policy issues.
- Application of existing technology.
- Perception and behavior.

A sourcebook was published to document the activities that took place at the meeting. The sourcebook is described separately in the "Research & Analysis" chapter later in this section.

■ Governor's Conference on Rural/Suburban Fire Protection in Louisiana (93)

More than 80 particiapnts participated in this October 1989 conference. The goal was to reach consensus on the most pressing issues in the state's complex interface fire problem. A conference report is described in the Reports chapter of this Section.

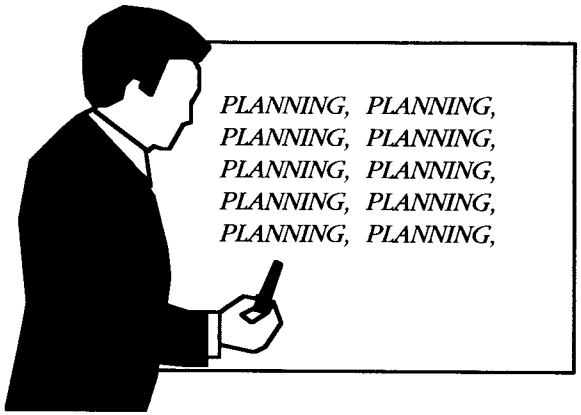
■ Palm Coast Wildland/Urban Wildfire Mitigation Study (24)

Palm Coast and Korona were the scene of two wildfires that destroyed 131 homes in 1985. It was identified as the most destructive wildfire in Florida history. Pushed by 40-mph winds, the fire fed on a 10-year accumulation of forest litter beneath the slash pines. The pines were closely planted for timber harvest but the area later changed to residential neighborhoods. Now volunteer canvassers have covered the same area to gather information for a University of Florida study on wildfires.

The study will take a look at how residents perceive the danger of wildfire and whether they have taken any action to prevent wildfire damage to their homes. A $10,000 grant from the U.S. Forest Service funded the study.

An earlier study looked at the factors contributing to whether a home was destroyed or survived the fire. Three critical factors were: the distance of brush clearance, intensity of the fire and whether it crowned nearby; and the type of roof/eave vents. The last item was somewhat a surprise. Homes with plastic soffit vents for ventilating the eaves burned more readily than homes with metal screens in the soffit vents.

One person involved with the study said there still is very little being done on the part of homeowners to prevent a similar fire, but investigators hope to use the new study to come up with a solid plan that has the approval of the affected residents.



■ Wildland/Urban Interface Fire Protection Plan for the Cinder Hills Interface Protection Area, Flagstaff, Arizona (26)

This is a 1988 plan to mitigate the fire hazards in the Cinder Hills area of Arizona. It provides a framework for cooperation for involved agencies for protection of life and property resources. "It is intended to be reviewed, amended, and updated on a regular basis to maintain the integrity and ambitions of this project."

The plan observed that 23 of 26 wildfires in the boundary of the Cinder Hills protection area were man-caused, adding that as population increases, man-caused fires are likely to increase as well. Furthermore, the Flagstaff area experiences frequent seasonal droughts.

The developers of the plan include the Arizona State Land Department, Downey Park Fire Department, Timberline-Fernwood Fire Department, and U.S. Forest Service, with support from Cocopai Resource Conservation and Development.

■ Fire Safety Considerations for Developments in Forested Areas: A Guide for Developers and Planners (27)

This is a draft copy from the Kittitas County Fire Prevention Cooperative in Washington State. The county was identified as a high-risk area for potential extensive property loss.

The plan presents a wildfire hazard rating system and recommends guidelines for reducing hazards, including vegetation clearance. Other topics covered include:

- Structural designs and materials
- Road access specifications
- Fire fighter water supplies
- Solid waste disposal
- Fire department authority

■ State of Oregon: An Action Plan for Protecting Rural/Forest Lands from Wildfire (28)

The introduction states, "The Task Force, through an interagency agreement, was charged with developing a coordinated state response to the increasing risk to Oregon forest lands posed by the siting of dwellings and other uses and structures on our

rural and resource lands."

When the plan was presented to Oregon Governor Goldschmidt it was called "a first step toward the goal of safeguarding state forest resources as well as the welfare of our rural residents and their homes and communities."

Making up the referenced Wildfire Planning Task Force were the Department of Forestry, Department of Land Conservation and Development, the Emergency Management Division, and the Office of the State Fire Marshal.

The illustrated 28-page document contained four chapters and appendix material. Chapter 1 gave an overview of the Oregon interface situation and called the 1987 fire season the worst ever. This section reminded readers that everyone in the state pays for wildfire suppression costs.

Chapter 2 looked at six major problems affecting the wildland/urban interface areas. The general areas were policies, attitudes, regulations, prevention efforts, suppression, taxes and insurance.

Chapter 3 was a reminder of the accomplishments to resolve some of the problems in the areas of communications, command structure, cross training, town meetings, workshops, and slash burning.

Chapter 4 presented 20 task force recommendations organized according to the agency responsible. Completion dates were also listed.

■ Assessment for Threat from Wildfire for the Manorlands Development, Utah (29)

The Utah Division of State Lands and Forestry inspected this development for its homeowners association and determined that the various hazards found give the area a Fire Danger Rating of high. The Division also provided a mitigation plan and recommended that the homeowners association make copies for every lot owner.

The plan was presented in three parts. Part 1 dealt with the methods and specifics of wildfire hazard assessment. Part 2 contained recommendations and practices for lot owners to reduce the hazards. Part 3 explained the individual lot wildfire hazard assessment form used; the form was completed for each lot with a permanent structure. The area is still under development, with 132 cabin sites developed at the time of the plan.

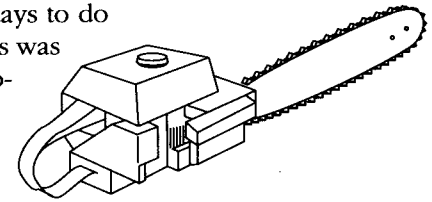
In this area of Utah the dominant fuel types are aspen, pine, grass and sagebrush. Each of these fuels was discussed in the plan, along with associated special hazards. In this case the area is generally without water supplies, requiring water to be trucked in over narrow, often unimproved dirt roads. Some may be too narrow for any access by tankers and other emergency vehicles.

The topics for which specific recommendations were offered included:

- The need for installation of a hydrant system.
- Lot identification.
- Fuels and vegetative manipulation.
- Access roads and access to lots.
- Structural design for homes and cabins.
- Fire notification and escape plan.
- Training for residents.
- Overhead power lines.
- Fire pit construction and maintenance

■ Trail's End Woodland Home Development Plan Update (44)

A small initial effort in Virginia has resulted in impressive response by property owners. It started when the Virginia Department of Forestry prepared a development plan for the 800-acre Trail's End Campground. The plan outlined potential forest fire hazards and provided a 16-point hazard reduction plan. One of the main hazards was the accumulation of thick understory vegetation that would enable a fire to spread quickly. Lot owners were given 30 days to do their own cleaning; if this was not done, the owners association would clean out the debris and send the owner a bill.



As of January 1990, all but 100 of the 1800 lots were cleared. The fire hazard has been reduced, while property values have increased. The threat of Southern pine bark beetle has been reduced with the removal of dead and dying pines.

Public awareness of fire safety matters has also increased during the clearing program. The owner newsletter has featured several articles with checklists and fire prevention tips, along with constant updates of the clearing program.

The Trail's End plan was the result of a program begun by the Virginia Department of Forestry in 1986, when the 50 highest-risk woodland home development areas in the state were identified.

During 1986 through 1988, fire prevention plans were written for these developments with input from fire departments, planners, companies and other agencies. As each plan was written, programs were initiated to implement the plans.

Department of Forestry officials say it is too early to access overall results of the program, but they note that Virginia has not experienced the loss of a home from a wildfire since 1984, although 1986 and 1987 were severe fire years in the state.

■ Marking Homes for Dangerous Conditions (45)

Three wildland/urban interface issues are being addressed with one program in Wisconsin. The three issues are legal liability for decisions made during a fire that some homes may not be defensible, fire fighter safety, and unreasonable public expectations of fire suppression chances when a big fire is underway.

One township's response has been a stenciled marker and address post at the end of every driveway. It is a system that is fast, visible, long-lasting, inexpensive and easy to document. It serves as a way to prioritize fire suppression responses.

The marker consists of a letter/number code in conjunction with a color code. A bright yellow spray painted band indicates that the driveway is either too narrow or does not provide an adequate turnaround at the end. A bright orange band indicates that stationary action by fire equipment as the fire passes will not be possible under extreme burning conditions.

The designations were made during routine fire-prone inspections. The letter/number code designates the relative degree of fire safety of the home and surrounding area.

In addition to alerting fire fighters of conditions at each home, the markers are hoped to produce a strong motivational force to improve any fire safety deficiencies. A low-rated home signals to a homeowner—going and coming—that their home is marked a "loser" in the event of a major fire. Neighbors can also see every marker, so peer pressure is expected to be a positive factor for improved action by homeowners for their own fire protection. The marker system makes arrangements for upgrading a rating code when improvements are made. Unauthorized changes would be a violation.

Fire protection agencies also hope that the markers will provoke some questions from insurance carriers. In any event they believe that the fire prevention message can no longer be sugar coated. Education, they say, is important but not enough.

■ Fire Protection in the Wildland/Urban Interface: A Montana Viewpoint (20)

This is a 100-page thesis written by Michael Dannenberg for a Master of Forestry degree. He said he hopes the document will provide local governing authorities, fire protection authorities and land developers with some insight as to the fire problems threatening wildland/urban development. Although the title is focused on Montana conditions, the material can serve as a useful overview to interface fire problems for any interested person.

Chapters cover wildland/urban fire history, fire dependent environments, how disasters develop, existing hazards and risks, predicting wildfire danger and behavior, the regulation of subdivisions, subdivision design, and creating the wildland/urban interface conflagration.

To make wildland areas safer for residential development, the author examines three categories: technology, education and economic incentives.

Under technology he discusses governmental planning, vegetation management, and the importance requiring developers to adhere to minimum standards. The latter includes provisions for emergency vehicle access and adequate water supplies. When the fire starts and becomes large, communication and coordination problems are possible when the fire must be fought by multiple agencies. In one sense technology cannot help: He says even the best equipped and most experienced fire fighting forces in the world are helpless against a hot, intense wildland fire.

Under education he discusses the importance of teaching homeowners and forest users to control sources of ignition, modify hazards and mitigate losses. Most fire ignitions continue to be caused by people.

Under economic incentives he discusses ways to fund the fire prevention and fire suppression needs always present in wildland/urban interface areas. One example would be tax reductions for firesafe practices by homeowners, which should reduce the cost of public fire protection services.

■ Fire Seasons in Eastern and Southeastern Massachusetts (21)

The author, Boston Fire Department Battalion Chief Robert Winston, notes that this densely populated and highly industrialized city contains numerous wildland areas that do burn during the spring fire season and in the fall if it is very dry. These areas are surrounded by many wood-framed dwellings and other structures. Of particular concern is the highly flammable "elephant" or marsh grasses that average eight feet in height and cover thousands of acres in and around Boston. Also of concern are the additional brush and woodland areas that are located in the west/southwest areas of the city. Over the years, population shifts and newly built wood-framed structures have created definite wildland/urban interface problems.

The Boston Fire Department averages about 1,000 mostly small vegetation fires annually. Depending on the fire weather conditions, these small fires can and do grow much larger. For example, one recent marsh-grass fire grew to over 125 acres in the lower Dorchester section of the city. Wood-framed dwellings and Boston fire fighters were exposed to rapidly moving fire flanks of up to 1,000 feet in length with flame heights of over 30 feet.

To control these interface fire problems most communities operate some type of brush fire unit. Within the Plymouth and the Barnstable County areas about 60 "brush breakers" are used for wildfire suppression. The larger units can carry 1,000 to 1,500 gallons of extinguishing agent. Breakers are all-wheel-drive with pump-and-roll capability. The fire fighters who operate these rugged powerful vehicles are cross-trained to fight both wildfires and structural fires.

Once the fire's flanks are located, the breakers' front push bars are employed to literally push through brush and trees, creating their own access path to the fire. Following the flanks, the fire fighters apply extinguishing agent to the flames at close range, and work their way up to the head fire and pinch it off at that point. At large fires the incident commander will generally commit task force groupings of about five breakers to attack the fire. Engine companies are strategically placed for structural fire protection, if needed. A small fixed-wing aircraft is also employed and advises the incident commander and the breakers, as to access, path of fire's travel, location of endangered structures, and progress of fire control and containment.

Also aiding the Massachusetts fire services is the Department of Environmental Management (DEM) Bureau of Forest Fire Control. This state agency operates fire towers, small brush fire units, four brush breakers, and some water tenders. The fire towers are a key element for early fire detection, quick responses and keeping losses to a minimum.

■ NFPA Summary of Activities: Second Phase, October 1987—September 1988 (22)

This report covers the background of National Fire Protection and other sponsoring organizations cooperation to develop a national program to focus both public and fire service awareness on reducing losses from wildland/urban interface fires. Three goals were identified:

- To create general public awareness of the interface problem.
- To encourage formation of partnerships among problem-solvers and interest groups.
- To focus development of local solutions to the wildland/urban interface fire problem.

The individual programs and items produced from the NFPA/USFS cooperation are described in separate sections for video and satellite broadcasts, reports and conferences.

■ Wildfire Strikes Home in Texas: Report of the Governor's Conference on Rural/Suburban Fire Protection (23)

The 300,000-acre Shackleford County wildfire was the catalyst to bring together many diverse groups and individuals involved with this Texas fire problem. That fire burned for five days in west Texas during March 1988. Fortunately the affected area was sparsely populated, but many areas of higher population were said to be relatively unprotected. About 38 percent of the people in Texas live outside of a fire protected jurisdiction.

The 32-page report covered information developed in six major areas. 1995 goals were established in each area.

- Who's in charge?
  Goal: A state agency shall be designated to coordinate and provide fire service leadership.
- Who Sets the standards?
  Goal: Establish statewide building, fire and development standards.
- Training volunteers.
  Goal: Develop a statewide standard cross-training system.
- Public attitudes.
  Goal: The wildland/urban dweller will understand the rural fire problem and have a positive attitude toward fire safety.
- Organized fire protection.
  Goal: Provide statewide fire protection with reasonable response times by properly funded, trained and equipped fire service personnel.
- Funding.
  Goal: Have funding available for training and equipment for all, based solely on need. Define rural fire departments as a legal entity. Organize VFDs in all communities. Set limits on insurance liability for VFDs. Increase the knowledge of VFDs in how to apply for funds.

■ The Granada Hills Brush Fire of December 9, 1988: A Report by the Los Angeles City Fire Department (30)

This 3,200-acre brush fire during dry conditions and strong winds caused serious damage or the loss of 44 structures and damage of more than $5 million. The winds, estimated gusting up to 70 miles per hour and sustained at 25 to 40 miles per hour, prevented use of fixed-wing aircraft for water drops. More than 170 fire companies from Los Angeles City and mutual aid depart-

ments fought the fire. Chaparral fuel loads in the area were reported up to 25 tons per acre. Meanwhile relative humidity levels were below 20 percent. Flame lengths reached heights up to 100 feet. Subsequent computer modeling of the conditions indicated that the fire was capable of spot fires 1.39 miles in advance of the main fire front.

All homes damaged or destroyed were said to be in compliance with the city Brush Clearance Program, with clearance to a minimum of 100 feet. Combustible roofs, however, provided easy spread of the fire to the homes. Of the 33 homes reporting roof loss, 21 had wood shingle roofs. Only one noncombustible roof suffered loss from direct exposure to fire brands.

According to the 150-page report, the fire had all of the same conditions that existed in past major brush fires, such as the 1961 Bel Air fire that destroyed 500 homes. Fewer homes were lost this time due to improved allocation of fire suppression resources from the lessons learned from the past fires. Fire command personnel were better able this time to anticipate the spread of the fire and assign forces to deal with the threat.

The report was a result of a fire department policy to document significant fires in order to identify the need for improved standard operating procedures and legislation.

■ Preventing Fires in the Wildland/Urban Interface: How the Rural/Metro Fire Department Does It (37)

Rural/Metro is a private sector subscription fire service that began 40 years ago in Arizona and now earns $60 million annually while protecting 5,000,000 people in 50 communities across the United States.

Rural/Metro describes its home area around Scottsdale as an ideal breeding ground for wildland fires. It is one of six agencies that have formed the Southeastern Arizona Wildland/Urban Interface Coordinating Group, the first of its kind in the state. A 10-page booklet describes Rural/Metro's efforts to prevent interface fires. Among the sections are: public education; media coverage; cable television; customer newsletters; special events; home fire safety inspections; homeowner association meetings; posting of signs advising the public of fire danger ratings; and broadcast of daily fire danger forecast reports. Other topics are efforts at early detection and political education of local officials on the importance of regulation of wildland development.

The booklet also lists the local priority interface fire problem areas and shows how the calculations were made to produce the factored hazard rating (combined slope and fuel ratings were added to a structure hazard rating) for each subdivision or residential area. For example, Desert Mountain Estates is shown to have a factored hazard rating of 19 (high), while the Boulders area has a rating of only 2. Pinnacle Creek had a very low hazard rating for slope and fuel but had a high hazard combined rating due to the use of flammable roof and siding materials.

■ Building Interagency Cooperation (85)
■ Protecting Your Home from Wildfire (86)
■ Fire Fighter Safety in Wildland/Urban Interface Fires (90)

These printed reports were prepared to accompany videotapes of the same titles. The content of the videos and the printed documents is described in the Videos section.

■ Fire Management Study Group of the North American Forestry Commission (88)

This international group meets annually to address common wildfire programs in North America, including the wildland/urban interface. The efforts of this group to address wildland fire management issues was an extension of the need to build not only local interagency cooperation, but also international cooperation. The report recaps 25 years of progress through international cooperation; 5,000 copies were printed to promote the concept of countries forming alliances to share expertise and equipment to combat wildfires along common borders and beyond.

■ Governor's Conference on Rural/Suburban Fire Protection in Louisiana (93)

Conference participants reached consensus on five interface issues and these were detailed in a special report. The areas addressed included training fire fighters, rural water supplies, insurance, leadership and funding. All of the goals were set with 1995 target dates.

The report explained that in 98 residences and structures were damaged or destroyed by wildfire in 1989, and an additional 1,251 were threatened but protected by fire fighting efforts. The overall risk is much higher: "The value of rural residences and forest lands in Louisiana can be conservatively estimated at some 26 billion dollars."

■ Black Tiger Fire Case Study Report (9)

A 40-page report looked at this significant interface fire in which 44 homes and other structures were destroyed or damaged by a fast-spreading fire in July 1989. Published by the National Fire Protection Association, it was sponsored by the members of the National Wildland/Urban Interface Fire Protection Initiative, including NFPA, the USDA Forest Service, the National Association of State Foresters and the U.S. Bureau of Land Management, National Park Service, U.S. Fish and Wildlife Service and U.S. Bureau of Indian Affairs. The abstract of the case study states:

"A human-caused wildland fire starting on July 9, 1989 in a scenic part of the Rocky Mountains near Boulder, Colorado, swept through residential areas nestled among the trees. Within the first five to six hours after ignition, 44 homes and other structures were destroyed and many others were damaged. The fire was not completely stopped until four days later, after burning almost 2,100 acres. Loss estimates to homes and natural resources amounted to $10 million, and the cost to control the fire was another $1 million.

"More than 500 fire fighters from local, state and federal fire agencies eventually worked to contain the fire and protect the numerous other homes built in the rustic surroundings. Some of the fire fighters' own homes were threatened or destroyed by the fire. Only a few minor fire fighter injuries were reported and one resident was hospitalized from burns.

"The result of this wildfire, especially the loss of the homes, represents an increasingly common example of the risks of building homes in what is called the wildland/urban interface, the term for a border zone where structures-mainly residences-are built in wildland areas that by nature are subject to fires. This fire, which soon outran the fire defenses in difficult terrain, showed the predictable effects of a combination of factors: lack of rainfall; prolonged heat spell; wind; sloping topography; buildup of forest fuels; construction factors affecting the susceptibility of the home to fire; use of combustible construction materials; poor site access to emergency vehicles; and lack of a home's site maintenance for fire protection. These factors plus the number of homes that were quickly threatened compounded the problems for the fire fighters.

"For several years fire protection agencies have been attempting to warn affected homeowners nationwide of the risks of these wildland areas, but most homeowners remain not fully aware of or are insufficiently concerned about the problem. Many publications also offer guidance for homes in the wildland/urban interface. Proposed NFPA 299, *Protection of Life and Property from Wildland Fire,* would be a national standard which would present fundamental planning and design criteria for fire agencies, planners, architects, developers and government for the protection of life and property. It includes information on procedures and practices for safe development in areas which may be threatened by wildfire. To assure that it would be an acceptable document, it—as are all standards developed by the National Fire Protection Association—is being prepared by a committee of those who would be most affected: homeowners; interested individuals; architects; urban planners; and fire officials from local, state and federal agencies.

"The Black Tiger Fire was the worst wildland fire loss in Colorado history, but the conditions that led to it are still prevalent in many other parts of Colorado as well as in other states. The trend to building combustible homes in the flammable wildlands continues. In many of these areas the potential for similar or worse disaster is currently present, needing only an ignition

source and the unfortunate development of hot, dry, windy weather conditions that come with dangerous regularity every year."

The publication is illustrated with several maps and color photos. Chapters look at the interface problem in general and in Colorado, the weather conditions and fire origin, the effects of slope on fire growth, an analysis of factors affecting the loss of homes, and recommendations for avoiding similar fires elsewhere.

■ Wildland/Urban Interface Resource Material Inventory (25)

To help those interested in reading more about the subject, the Wildfire Prevention Working Team of the National Wildfire Coordinating Group compiled a 33-page inventory of resource material covering education, engineering and enforcement. The Inventory was then updated and re-released in January 1989. Its preface acknowledges that the publication is still "in no way complete. It will continue to grow as problems at the interface escalate." The Inventory will again be updated as new material is distributed.

The current Inventory is composed of five sections, including materials classified under books, proceedings and large reports; articles, chapters in books and short reports; brochures, posters and other short material; periodical resources; and audiovisual resources. The section on books contains seven pages of references. About 120 references are given. The articles section runs almost nine pages. More detailed descriptions, including addresses, are provided for the periodicals listing.

Eighteen video and film items are listed under visual references. An interesting pair would be the video on the Cold Springs Fire in a subdivision of Sisters, Oregon, and a companion update video called "Cold Springs Fire (Three Years After)." A note lists additional sources of audiovisual material, including the Boise Interagency Fire Center and the National Audio Visual Center in Washington, D.C.

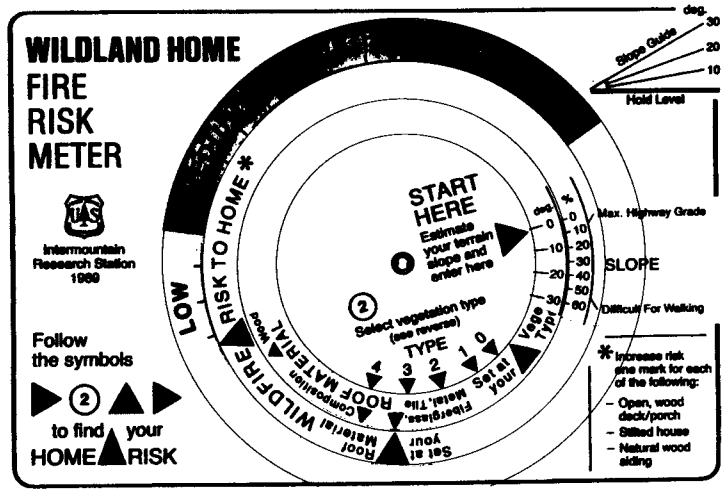
The human resources section from the first Inventory contains a list of people (United States and Canada) to contact for more information. Full titles, affiliations, addresses and phone numbers are given, and more than 150 individuals are listed. However, this section was dropped from the more recent publication.

Ordering information is given in the following Index of Examples. Readers are encouraged to send submission samples for the next update to Linda Donoghue, North Central Forest Experiment Station, 1407 South Harrison Road, Room 220, East Lansing, Michigan 48823.

■ Wildland Home Fire Risk Meter (89)

Developed by the Intermountain Research Station, U.S. Forest Service, t his handy card-type, multiple-dial fire risk meter allows homeowners to determine their homes' risk from wildfire. In fact, the very act of participation by an individual homeowner is an important part of the exercise because this activity assures greater involvement with the intended message than, say, passively listening to a radio fire prevention message and not necessarily paying attention to it. To use the meter, a homeowner would successively line up the three dials according to the different risk factors, which are explained on the back of the card. Only four simple steps are involved:

- Estimate the terrain slope around the home and line up the first dial.
- Select the vegetation type rating from the chart, from "0" for watered lawns to "4" for dense evergreen forest having many treetops touching, etc., and line up the rating on the second dial.
- Select the roof material, from "metal" to "wood," and line it up on the third dial.
- The wildfire risk meter then points to the danger rating, from "low" to "extreme."



The paper cover sleeve for the Wildland Home Fire Risk Meter contains additional information on ways to lower the risk to a home from wildfire.

■ People and Fire at the Wildland/Urban Interface: A Sourcebook (92)

This publication documents the activities of the Wildland/Urban Fire Interface Workshop for Social Scientists held in North Carolina (see separate description under the "Conferences" chapter earlier in the section).

The Sourcebook contains background on the "people" problems discussed at the meeting. The focus was on the role of social scientists in solving the problems of interface areas. A main goal of the publication was to facilitate further networking and collaboration on research, development and application projects. To that end, a list of people resources with addresses and phone numbers is included in the last chapter.

Twelve workshop projects form the core of the publication, including:

- A Model for Project Costs and Benefits
- Factors Encouraging Construction and Maintenance to Reduce Fire Loss
- Risk Assessment
- Application of Hazard Mitigation Strategies
- Interface Homeowners' Perceptions
- Define, Describe and Quantify the Interface Fire Problem
- A Coordinating Mechanism for RD&A Work on the Interface
- Management of Fire and Environmental Quality in the Interface: An Integrated Approach
- State and Local Actors and Actions
- Post Fire Disaster Mitigation
- Historical, Legal and Policy Responsibilities and Roles

An annotated bibliography is also included in the 72-page publication.

■ Assessing the Ignition Risk to Structures in the Wildland/Urban Interface (98)

U.S. Forest Service researchers from the Forest Products Lab, the Riverside Fire Lab, and the Southern Forest Fire Lab are designing an Ignition Risk Rating System that will enable community planners, developers, fire protection personnel and property owners to assess and thereby reduce, if necessary, the fire risk to a new or an existing home. It also enables them to evaluate the change in ignition risk during a wildfire if specific changes are made in a building or its surroundings. When completed, the system will provide a way to:

- Balance homeowner values and preferences with fire safety requirements, enhancing homeowner acceptance of actions needed to decrease fire risk.
- Evaluate factors that contribute to fire risk, allowing for site-specific and property-owner actions that meet fire safety requirements.
- Inform and educate planners, developers, and homeowners of fire risk to either new or existing properties.
- Inform protection agencies of the risk to homes, leading to more informed suppression strategies during interface fires.

The Ignition Risk Rating System requires information on the specific attributes of the building site and surrounding terrain, the kind and proximity of surrounding vegetation and other fuels, the characteristics of the building design, and the materials used in its construction. The fire behavior severity is based on the use of historical fire weather conditions. The System will then generate a relative risk rating (low, moderate, high, or extreme) that indicates the ignition potential for that structure.

The System is being designed for a lap top computer which can be used in the field to record and process information for a site as it is inventoried. Fire behavior information will come from a data base developed from weather records for the area. The effects of changes to reduce the likelihood of ignition, such as clearing specific vegetation on the site or using more fire-safe building materials or construction practices, could be quickly displayed.

Researchers are currently developing the Ignition Risk Rating System and hope to have an initial version ready for field testing early in 1991. When their task is completed, people living in or near the wildland/urban interface will benefit from a tool that will identify a variety of fire safe measures that reduce fire risk and also best match specific homeowner desires.

■ Arizona GIS Maps (41)

The Arizona State Forestry Division has a state-of-the-art graphic information system (GIS) in full operation supporting various programs. The system can produce maps depicting fuels and other fire information. A future use will be to identify state wildland/urban interface areas with data from satellite remote sensing.

■ Wildfire Safety Guidelines for South Dakota Rural Homeowners (32)

This 18-page booklet on quality paper with four-color photographs was prepared by Keep South Dakota Green Association and the South Dakota Division of Forestry. Funding came from a grant made by the National Criminal Justice Association and the National Community Volunteer Fire Prevention Program.

Keep South Dakota Green Association was formed after the disastrous fire season of 1949. It is a voluntary conservation organization to arouse public awareness of the dangers of forest fires in the Black Hills. The association believes that unless steps are taken to prevent it, another disastrous wildfire is inevitable. According to the publication, the problems facing the Black Hills include:

- Unnaturally high fuel loading due to 111 years of fire suppression without addressing forest management needs.
- Increased leisure time and expendable personal income have made it possible for people to move away from the hectic urban life-style to tranquil forested settings.
- People moving into the rural environment assume they bring city structural fire protection with them.
- People underestimate the danger of living so close to flammable vegetation.

The booklet is intended for use by homeowners to make their homes and surroundings safer from wildfire. Among the topics discussed are: safety zones around homes, common forest fuel classes and what to do about them, proper forest management, water supplies, accessibility for emergency vehicles, and a fire safety checklist.

■ Wildfire Protection: A Guide for Homeowners and Developers (33)

Chapters from this 26-page booklet published by a multiagency group in California and Nevada include:

- Building Your Home
- Modifying and Maintaining Your Home
- Developing a Fire Plan
- When Caught in a Wildfire
- Developing a Subdivision
- Fire-Resistant Plant Species
- Agencies Can Help

This is one of few guides that discusses what to do when caught unintentionally in a wildfire or when making the deliberate decision not to evacuate. This is one of the longest checklists in the booklet. One useful warning that might not be universally understood by homeowners attempting to battle a fire and save their homes is not to wear synthetic clothing that can melt onto the skin. Another smart tip is to always call the fire department if fire is spotted; do not assume that someone else has already called. The problem can be that everyone assumes and no one acts.

The last chapter lists addresses and phone numbers for 12 federal, state and local fire agencies offering not only fire suppression response but also assistance in fire prevention planning before the next fire.

Sponsoring organization include the U.S. Forest Service, U.S. Department of the Interior's Bureau of Land Management, Nevada Division of Forestry, and fire departments from North Lake Tahoe Fire Protection District, Douglas County, Truckee Meadows, Carson City and Tahoe-Douglas Fire District.

■ Fire Safety Considerations for Developments in Forested Areas: A Guide for Homeowners, Home Buyers and Builders (34)

This 10-page booklet was published by the North Carolina

Division of Forest Resources at a low expense of just 15¢ per copy for 750 copies. It cautions that it is not intended for use as an exclusive source of information, and a bibliography of more specific sources is included for further reference.

The introduction reminds readers that the forests were the foundation of the first major industry in the state's colonial times. As for modern times, "The haphazard patterns of subdivision development have caused great concern among fire authorities." This increasingly complex situation "requires the closest kind of cooperation and mutual aid on the part of all fire protection agencies."

The main section describes and illustrates recommended minimum fire safety requirements for builders and homeowners. According to the introduction, "These recommendations are made with a view of satisfying long-term needs. While they may seem demanding in the initial development of a subdivision, they will serve the needs of a fully developed community."

For additional assistance the booklet lists District Forester contact phone numbers for 13 areas of the state.

GUIDELINES

■ Wildfire Hazards and Residential Development: Identification, Classification and Regulation (35)

Published by the Utah Division of State Lands and Forestry, this 86-page book was prepared for three main groups of readers: county and municipal planning commissions, to formulate fire safety ordinances and codes for wildland subdivisions; fire departments and foresters, to assist local governing authorities by reviewing proposed plans for subdivision development; and land developers, to prepare plans for subdivision development.

Use of the material begins with the section on Wildfire Hazard Identification, which discusses the nature of wildfires and the relationship of fire behavior to subdivision developments under local conditions. This leads into Wildland Subdivision Design and then Basic Wildland Subdivision Regulations.

The authors state: "These are basic recommendations. Based upon specific conditions, individual subdivision plans should be reviewed by the planning commission, local fire authority or state forestry official, and then classified according to the Fire Hazard Severity Scale. Development standards should be based upon the three adjusted standards (moderate, high and extreme hazard)."

Classification is determined from rating five factors affecting fire safety:

- Slope, in percent from horizontal
- Aspect, or direction in which the ground faces
- Weather, measured in number of critical fire weather days per year
- Response Time, from nearest fire department, measured in minutes
- Vegetation, categorized by fuel types.

The ratings for each factor are added to produce a composite rating, and the corresponding hazard and classification is determined from the table.

Slope Rating		Aspect	Weather	FD Resp.	Vegetation
1	≤10	N	≤1	≤15	Pinyon-juniper
2	20	E	3	30	Grass, sagebrush
3	30	level	5	45	Hardwoods
4	45	W	7	60	Mountain brush
5	≥60	S	≥9	>60	Softwoods

Rating	Hazard	Classification
5 to 11	Moderate	1
12 to 18	High	2
19 to 25	Extreme	3

■ Fire Prevention Handbook (Fire Prone Property Program) (36)

This publication from the Wisconsin Department of Natural Resources provides guidelines for fire control officers to make contact with and inspect the property of individual owners determined to be living in the high forest fire hazard area. Inspections are to be made no less than once each five years. Supplies used by the fire control officer include:

- Introductory letter to the homeowners notifying them that they are in the high hazard area.
- Fire Prone Property Inspection Sheet.
- Incinerator diagram.
- Digest of fire laws.
- Brochure: Be Aware of the Fire Prone Property.

■ Virginia Department of Forestry Wildland/ Urban Interface Fire Protection Handbook (38)

The preface states that much of this handbook is condensed from a textbook prepared for a wildland/urban interface course at the National Fire Academy. The handbook was distributed to all the state's regional foresters. Its four chapters are:

- *Assessing a wildland/urban interface.* "To take effective action against the wildland/urban interface problem, we must understand those factors such as risk and hazards, all of which contribute to the interface fire problem."
- *Protection options.* "...the selection of protection strategies and options should be the next step in preparing a wildland/ urban interface fire protection plan. Well-planned structural options, vegetative management, infrastructure options and public education should be used in the best approach to protecting the interface.
- *Building and maintaining support.* "Developing and maintaining support will be the key to the success of a wildland/urban interface protection program. Without the right support, all of the planning effort for a fire protection plan will be wasted."
- *Building an action plan.* "An action plan is a road map. It provides direction for the efforts to make a more firesafe community. The plan need not be hundreds of pages, expensive, comprehensive or intimidating. It should be clearly documented and well organized, and include strategies for involving those in the community who may be impacted by the wildfire problem."

■ Sample Zoning Ordinance for Fire Prone Property, Chisago County, Minnesota (39)

1 *Purpose.* The purpose of this Section is to establish specific regulations for developments located in fire prone areas. These regulations are established to minimize the chances of loss of life and property due to wildfires.

2 *Fire Prone Areas.* Fire prone areas are areas which contain natural conifer stands or conifer plantations, which due to flammability of the tree needles, associated ground vegetation, accumulation of duff on the ground and presence of drought soils pose a great potential for rapidly spreading wildfires.

3 *Regulations for Developments in Fire Prone Areas.* The following regulations apply to developments proposed in fire prone areas as determined by the Zoning Administrator:

A. The solid portion of a conifer stand shall be removed for a distance of seventy-five (75) to one hundred (100) feet around the perimeter of the building. Single, well-spaced trees may be left in this buffer area.

B. All trees shall be removed in the 25-foot perimeter around the house. This will allow free movement of men and equipment in the immediate area around the building.

C. An alternate driveway shall be installed. Two driveways will allow an escape route to inhabitants of the building should one be blocked by fire. Driveways should be at least 25 feet wide and kept as straight as possible to allow traffic movement and to provide a firebreak.

D. Trees shall be pruned to a height of 10 to 16 feet. This will deter a ground fire from jumping into the tops of the trees (crown fire effect).

E. Home construction materials shall conform to reflect the relative fire danger of the area. Roofs and exteriors of buildings should be of fire resistant nature. Non-fire retardant shingles or siding, or materials which are not innately flame resistant should be avoided.

1. Underground power lines shall be encouraged.
2. Screening of chimneys with non-flammable material with opening no larger than 1/4 inch in size shall be required.

F. Each development consisting of multiple dwellings shall require an alternate means of egress as an escape route for all inhabitants. Minimum width should equal legal requirements of the ingress road.

■ Communications Guidelines for Communicating the Wildland/Urban Interface Fire Problem (95)

This 52-page document emerged from a workshop on public relations and communications conducted at the "Protecting People and Homes from Wildfire in the Interior West" conference in Missoula, Montana (see Conferences section). It provides useful reminders of the needs of various media categories and how to get the interface message heard above all of the competing messages. There are six chapters, plus samples of effective communications.

Chapter 1 concentrates on print media. Getting busy reporters to listen and respond to the interface message involves consideration to their pressures. For example, one caution states: "A newspaper's editorial room runs at a frantic pace, especially as

deadlines approach. Try to know these deadlines and consider the demands on the time of the reporters. Releases should be delivered when the pressure is least—never walk into the city room at deadline unless invited." Tips regarding photos are also given.

Chapter 2 looks at radio and television. These stations are described as cordial places run by managers who know they must operate in the public interest. However, an interface message still must be newsworthy, informative or entertaining. The difficulty increases when so many other organizations are also competing for the same available access to the public. Four preparation items are suggested for completion before the first visit to a station.

Chapter 3 covers announcements of an event, which is somewhat different from a regular news release. Usually it is important to an organization but not necessarily considered important by the media. Suggestions here are for brevity; for example: "Do not include extensive background material concerning the event itself or the sponsoring organization. Nor should you include names and background of various chairmen and committees who worked on the event. This material invariably is eliminated by the station."

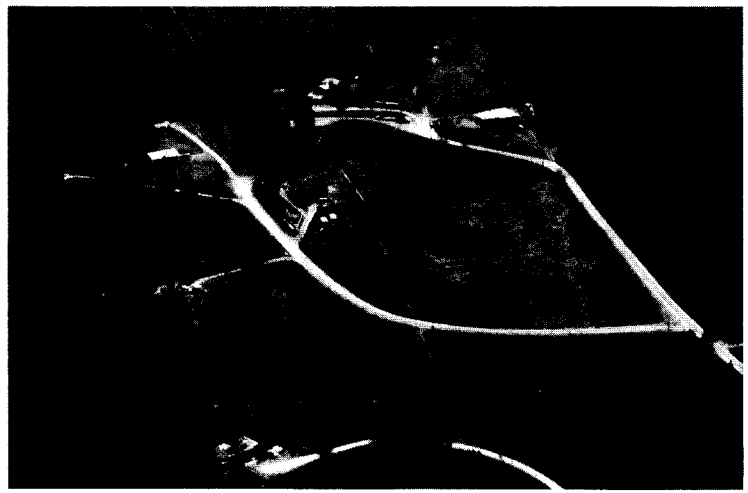
Chapter 4 discusses printed material other than newspapers. "A printed piece provides the opportunity to offer more than a fleeting impression of your work. The reader has time to analyze the material presented. Moreover, the total image or impression is more intense than a news story which must compete for the reader's interest in other news articles. This holds true for radio and television audiences." Eight "musts" for effective written communication are offered.

Chapter 5 describes exhibits and window displays. The first tip is this rule of thumb: "Keep your display simple and interesting so that someone on a galloping horse can read it!"

Chapter 6 addresses films and videotapes. These items represent a high impact for your message but at a relatively high price. To compute the value, figure the total cost and divide it by the potential viewing audience. This way the per capita cost can be compared to that for other items.

■ Proposed NFPA 299, Protection of Life and Property from Wildfire (94)

This National Fire Protection Association standard is under development by a committee of those who would be most affected: homeowners; interested individuals; architects; urban planners; and fire officials from local, state and federal agencies. The standard will present fundamental planning and design criteria for fire agencies, planners, architects, developers and government for the protection of life and property. It includes information on procedures and practices for safe development in areas that may be threatened by wildfire. When it is approved by the NFPA membership in its final wording it may be adopted by local jurisdictions.



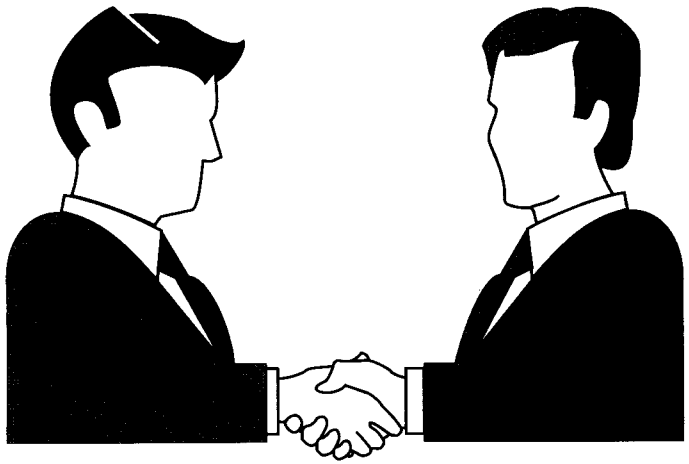
■ Guidelines for a Teamwork Approach to Multiagency Fire Management (31)

In today's changing social, political and economic climate, western Montana's fire protection agencies are teaming up to better deal with the complexities of wildland and structure fire protection.

The Missoula County Fire Protection Association is made up of 16 federal, state and local fire agencies. Each agency operates a fire protection organization to service its respective jurisdiction, and the association provides the opportunity for individual agencies to cooperate with and assist each other in all aspects of fire protection.

The principal intentions of the association are that the agencies will cooperate with each other in these ways:

- Through mutual assistance subject to existing and/or future agreements, regulations, codes and laws.
- In fire preventions and public information programs.
- In wildland and structure fire training.
- In the detection of and reporting of fires.
- Hold bimonthly meetings throughout the year in order to coordinate programs.



The association has an executive committee made up of a chairman, vice-chairman and secretary-treasurer. A finance committee works with the secretary-treasurer on financial matters.

Four permanent working team are responsible for meeting the objectives of the association. They are:

- Fire Prevention Working Team
  This team works at reducing the number of fires that start, including public education, law enforcement, personal contact and reduction of fuel hazard.
- Fire Training Working Team
  This team provides or coordinates a cadre of trainers and instructors in the areas of fire management and structure fire.
- Fire Suppression Working Team
  This team coordinates activities involved in dispatching, initial attack, reinforcement and overhead teams.
- Emergency Medical Services Working Team
  This team coordinates emergency medical activities through city, county, state and federal agencies.

The association has published a number of educational documents, including Fire Alert, a fire awareness magazine printed in color on slick paper.

■ Gateway Interagency Fire Front (40)

As often happens, a significant fire that threatened homes and crossed jurisdictional borders was the catalyst for an interagency agreement between seven organizations in Idaho called the Gateway Interagency Fire Front (GIFF). The 1987 City Creek Fire of Pocatello destroyed one home, forced the evacuation of 1,000 people and spread over almost 3,000 acres. The fire brought a wide variety of jurisdictions together for the first time. Prior to this, several agencies had thought about forming an interagency agreement, but action became easier after the fire.

There are several factors that contributed to the short time needed to reach agreement:

- The City Creek Fire scared the community and the leaders.
- None of the various agencies had the resources to do everything themselves; they all need each other.
- The fire taught all of the cooperating agencies that none of them have the ability to handle a fire of this scale by themselves.
- The first experience working together was so positive that each organization learned to better appreciate the others.

Probably as important as the positive working relationships gained by the various agencies was the graphic understanding that the various politicians and agency heads gained of how vulnerable the area was to these types of fires. This was very important when it came time to finalize a signed agreement.

The GIFF organization is fairly simple. GIFF has two co-chairmen. One represents a federal agency and one represents a local fire organization. Everyone serves on one of four teams: Public Education and Prevention Team; Legal and Resources Team; Dispatching and Communication Team; and Training Team.

The GIFF Agreement is fairly simple also. Basically, it says that each organization will cover its own expenses for the first 24 hours of any fire. After 24 hours the receiving agency or agencies negotiate with the others if they need continued support. The only exception is that air support is available to each agency but they may have to fund it.

Part of this agreement includes a map. Representatives of each agency sat down together and identified the local wildland/urban interface areas. Once this was done, it became part of the agreement. Within the GIFF boundary, any agency may initially attack a fire in the area. Additionally, any organization may request the assistance of another cooperator with a fire.

The agencies involved are Bannock County Emergency Services, Bureau of Land Management, and Inkom, Pocatello, Caribou, Chubbock and Pocatello Valley Fire Departments.

■ Town Forest Fire Warden Training Package (42)

The Maine Forest Service used slides of local problems, an edited video from the National Fire Academy and several printed materials in its program to train town forest fire wardens about the wildland/urban interface. The training introduction said the interface issue "is rapidly becoming the major concern of fire suppression personnel in rural areas."

The training was called important because "Public apathy and/or unawareness towards the problem has severely hindered our ability to gain a sympathetic ear from developers, planning boards, homeowners, insurance companies and others who help make up the wildland/urban interface picture."

Several areas are addressed by the training:

- Development of prefire plans to ensure rapid and coordinated response to fires.
- Development and implementation of an organizational system which can be used by both wildland and structural fire fighters.
- Continued cross training of structural fire fighting in wildland fire suppression techniques, and vice versa.
- Development of specialized equipment and tactics for use by suppression personnel.
- Aggressive public education of the nature and scope of the problem.

■ Closest Forces Agreement, Utah (49)

This agreement updates an earlier agreement between the Fishlake National Forest, Richfield Office of the Bureau of Land Management, the State of Utah and surrounding counties. The new agreement was "for the purpose of providing effective and responsive initial action for all lands involved and to minimize costs by reducing duplication of efforts."

All parties agree to:

- Provide initial action on a closest forces basis. Each entity will cover its own costs.
- Notify Richfield Interagency Dispatch Office of wildland fire reports to ensure dispatch of the closest available forces.
- Within two weeks provide the information necessary to complete a fire report.
- Notify agency of jurisdiction if initial action may not be successful.
- If the fire escapes initial action, the agency with jurisdiction will provide additional suppression forces as needed. Authorized personnel of the jurisdiction will assume command and responsibility of the fire when supporting forces arrive.
- Relinquish command of a fire which has exceeded initial action to authorized personnel.
- Any federal forces responding to a fire involving a structure are only expected to prevent the fire from spreading to adjacent fuels. Action toward suppressing a structure fire will only be taken by those forces who have that direct responsibility and capability.

■ Northern Rockies Coordinating Group (50)

This multijurisdictional group includes both wildland and structural protection agencies. It was formed in 1984, and in 1988 the combined agencies initiated a long-range interface program including public education, legislative action, modifications of wildland engines serving interface areas, and approaching local

zoning and planning commissions to urge fire protection considerations in local covenants and regulations.

Interagency dispatch centers have been formed in Billings, Helena, Dillon, Kalispell and Coeur d'Alene. They reduce response time as well as jurisdictional disputes and confusion when a fire occurs in an interface area.

■ North Idaho Fire Prevention Cooperative (51)

A fire prevention cooperative was formed in north Idaho and eastern Washington as a result of the 1986 Hangman Hills Fire in Spokane, which destroyed 22 homes. This event highlighted similar situations existing in other area communities. Five counties started the cooperative and also established partnerships with local volunteer fire departments, city structural departments and state and federal wildland agencies. The individual co-ops are working to carry the wildland/urban interface message to the local citizens and leadership.

Key elements of the first-year program were the development of an elementary school fire prevention curriculum, a wood stove safety program, and a smoke detector program for the elderly. The second-year program included completion of the school fire prevention curriculum, the development of a wildland/urban interface fire prevention booklet for homeowners, and the development of more than a dozen TV public service announcements for wildland fire prevention.

The effort has been partially funded with two $20,000 National Community Volunteer Fire Prevention Program grants obtained by the State of Idaho over two years. However, co-op members anticipate that the activities will continue to thrive after the grant expires. The separate cooperatives are working toward long-term financing through fund-raising events, additional grants, and partnerships with foundations and corporations in furthering their collective interests in wildland/urban interface fire prevention.

Other long-term plans include joint fire suppression training to provide for safer and more effective support operations in interface areas.

■ Memorandum of Understanding: Jackson County, Oregon, Department of Planning and Development and Rogue Valley Fire Service Agencies (101)

This Memorandum of Understanding provides guidelines for interagency cooperation. Among the declaration are the following excerpts.

The Chiefs' Association shall:

- Appoint a four-member interagency Wildland Interface Fire Committee. The Committee will:
  - — Meet every Friday to review development plans making recommendations for the siting of structures in wildfire hazard areas based on established criteria.
  - — Recommend any additional fire safety requirements as listed in the local code.
  - — Stipulate what fire district the development is in and what type of fire protection is available.
  - — Upon notice from County Planning, facilitate inspection of structures for compliance with fuelbreak construction requirements and any other fire safety items required by the approved development plan.
  - — Inform County Planning of the results of the inspection by letter with a copy to the affected property owner.
  - — Arrange one follow-up inspection of each noncomplying property owner.
  - — Provide expert witness testimony in any subsequent code enforcement actions.
  - — Facilitate fuelbreak maintenance inspections.

County Planning shall:

- Provide the Chiefs' Association Wildland Interface Fire Committee with development plans and recommendations for weekly review.
- Incorporate Wildland Interface Fire Committee recommendations as conditions on development plans.
- Notify property owners about fuelbreak construction and additional fire safety requirements.
- Provide information advising property owners on most economical time to construct a fuelbreak.
- Take necessary action to enforce the code and development plan conditions.

■ Boise, Idaho, Front Area Agreement, (106)

This fire prevention-oriented agreement includes Bureau of Land Management, USDA Forest Service, State of Idaho, Ada County Commissioners, and the City of Boise. Their concern is the urban growth into the wildland foothills around Boise. The efforts include zoning changes, door-to-door activity, prevention signs on roads, prevention patrols, cleanup in fire-prone areas, and some greenstripping efforts.

■ A Partnership for the People (61-64)

Four brochures published by the Florida Division of Forestry.

• No. 1: Home Fire Safety

"Fire killed 216 people during 1985 in Florida. Most of the blazes might have been prevented and nearly all the deaths avoided if a few precautions had been taken," states the brochure introduction under the heading "How safe is your home?"

A checklist allows a homeowner to see how a home rates. The main illustration depicts a wildland home with 10 potentially hazardous items noted.

• No. 2: Mobile Home Safety

Graphics show the 25 most common fire hazards in and around mobile homes. One instructs residents to keep vegetation at least 30 feet away from the structure. The brochure points out that mobile home occupants are twice as likely to die from a fire as occupants of other one or two-family residences.

• No. 3: Woodland Homes Fire Safety

This brochure concentrates the most on the wildland/urban interface issue. It begins, "Nestling homes into the smallest possible clearing in the woods is a trend growing in popularity in Florida. But it is a practice that can be extremely dangerous when it comes to protecting a home from fire."

According to the brochure, fire departments in Florida responded to an average of 67 brush and wildfires every day over a four-year study period. That's more than 99,000 fires.

The brochure presents ideas on using landscaping to create a firebreak.

• No. 4: Florida's Trash Burning Laws

The brochure also addresses the problems associated with man-caused wildfires started from improper trash burning and land clearing. Any local or county ordinance can forbid all trash burning under a variety of conditions. Where no local or county law forbids it, eight conditions are presented under which yard or household trash may be burned without prior authorization from the state. An additional restriction applies to non-rural counties.

■ Inside and Outside Your Home (65)

Palm Beach County Fire-Rescue Department, Florida

Tips for protecting homes in Palm Beach County (or anywhere else) are provided, grouped for steps to take with inside and outside areas. The brochure was a joint effort by the county and the Florida Division of Forestry. It demonstrates that a brochure can be produced at very low expense.

■ Fire Safety for Woodland Homes (66)

Volusia County Department of Fire Services, Florida

Reasons to play it safe: "Living in naturally wooded areas has become a popular life-style in Volusia County. Typical woodland homes are made primarily of wood. There are no fire hydrants, and the nearest fire station is miles away. These are just three of the reasons why such houses are so vulnerable to forest fires."

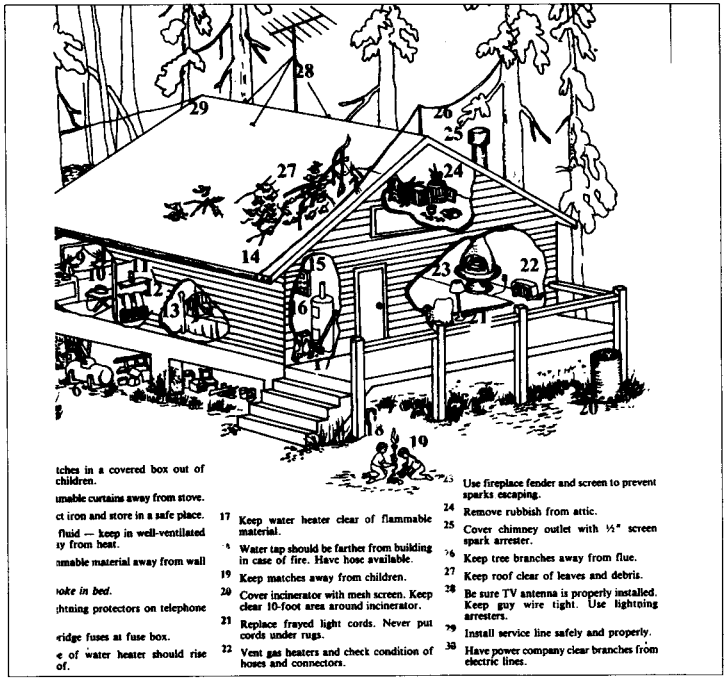
General hazard-reduction tips are given, along with a grid for planning a home evacuation route in case of emergency.

■ Help Protect Your Hideaway Home (67, 68)

Similar brochures published by
Michigan Interagency Wildfire Prevention Group
North Carolina Department of Natural Resources and Community Development.

Six ways to protect a wildland home are described:

- Maintain a ring of safety
- Remove dense underbrush
- Cut tall grass
- Rake away leaves and twigs



- Prune branches
- Properly dispose of leaves, grass and cuttings

■ Forest Fires Burn More Than Trees: Be Aware of Fire Prone Property (69)

Wisconsin Department of Natural Resources

Fire prone property is described as lands and buildings located on sandy soils with a thick covering of pine trees either in natural stands or in plantations. Homes in these areas are said to be very susceptible to loss if a major forest fire develops, and residents are warned: "Fire fighting forces cannot give individual attention to every building involved in a major forest fire. If you have taken the proper precautions in advance, you may be more successful in saving your buildings."

■ Your Home in the Line of Fire! (70)

Southern Group of State Foresters and the U.S. Forest Service

The headline declares: "During 1987, southern wildfires destroyed over 600 homes and major structures... and your home could be in the line of fire."

The brochure lists precautions a resident can take to protect a home, with tips offered under section covering home construction, home care, landscaping maintenance, emergency access and special problem areas.

■ Protect Your Forest Home or Summer Cottage (71)

Ontario Ministry of Natural Resources

An illustrated brochure offers fire safety guidelines for Canadian residents. One useful tip contains information not often mentioned in similar brochures from elsewhere: fiberglass boats and canoes are highly flammable and should be stored away from buildings, placed upside down in a clear area. Special procedures for reporting a forest fire in Canada are listed on a sticker that can be attached to a wall or counter near the phone.

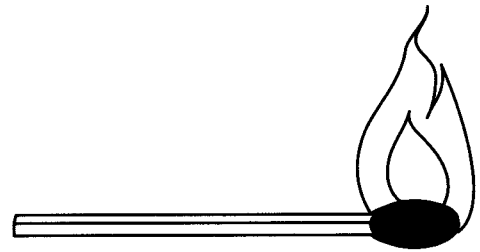
■ Could Your Montana Home Survive a Wildfire? (72)

This brochure was a cooperative project of several state and local agencies. It lists specific fires that have burned homes in Montana and warns that such fires are increasing as more people move outside of urban areas. Montana certainly has the scenic wildlands that so many people find desirable for homesites. Numerous tips are given to better protect these homes and property. The cover shows a stark scene of burned trees and the exposed fireplace of a home consumed by the fire.

■ How to Help Your Home Survive a Forest Fire (73)

Tennessee Department of Conservation

This inexpensive, illustrated brochure presents basic fire prevention tips. The main emphasis is on preparing the landscape surrounding a home to be an adequate defensible space in the event of a forest fire in the area. At a cost of under 6 cents each, this brochure also shows that reaching the public does not always require big budgets.



■ **Wildfire is the Enemy of your Forest Home: Reduce the Risk (74)**

Middle-Atlantic Interstate Forest Fire Protection Compact

Maryland, Delaware, New Jersey, Pennsylvania, Virginia and West Virginia make up this compact. The brochure information came from a joint training meeting. It includes fire prevention tips for homeowners, with an illustration covering 30 items.

■ **Wildfire: Are You Prepared for its Deadly Force? (75)**

Michigan Interagency Wildfire Prevention Group

This brochure presents a 19-item checklist for homeowners to learn how prepared they are to prevent or survive a wildfire. The brochure accompanies two videos described in the Videos section.

■ **Wisconsin Forest Fire Laws and Regulations (76)**

The Wisconsin Department of Natural Resources issued this pamphlet to describe the forest fire laws enforced by the department and to help the public understand the need for caution while using fire in the forests and wildlands. A sobering section lists the liability for suppression costs and civil liability for personal property damages a person may incur if a fire on private or public land escapes to become a forest fire. A calendar lists the months of relative fire activity.

■ **Florida's Forestry Arson Alert Association Brochure and Bumper Sticker (77)**

The brochure asks the question: Who loses when woods arson occurs? The answer is everybody loses. Consumers pay more for the products made from forest materials, jobs are often lost or disrupted, and families living in wooded areas often lose their homes and possessions.

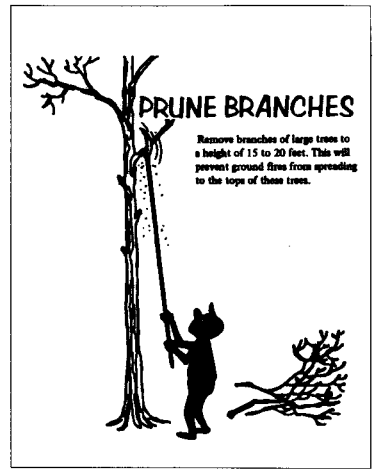
Individuals and organizations may join the association, which informs the public about woods arson and also acquires funds and distributes rewards (from $100 to $1,000) for information leading to the apprehension of an arsonist.

A related bumper sticker proclaims: "Woods arson burns everyone! Contact your local Florida Division of Forestry."

■ **Wildland Fire Dangers: Safety and Survival Precautions for Homeowners and Recreationists (78)**

Missoula County Fire Protection Association

This material is for use when fire prevention fails. It describes fire behavior for those who have never before experienced a wildfire. Separate sections discuss survival in buildings and survival in vehicles for those who did not escape the area before the fire front arrived.



■ **Burning is a Big Decision (79)**

Missoula County Fire Protection Association

"Burning dead vegetation can be very hazardous," warns this brochure, "If done incorrectly, consequences can be loss of life and property.

"Each year more and more wildfires destroy homes and cause fatalities. The problem will continue as long as people live in rural settings.

"An escaped debris burn can result in a devastating fire, so it's very important to think of the consequences before striking a match."

The brochure lists the proper steps to take before planning to burn and gives alternatives to burning.

■ **Protect Your Summer Home (80)**

Utah Division of State Lands and Forestry

Precautions for helping a home survive a wildfire are listed for before the fire (clearing combustible vegetation), debris

removal (burning permit required for burning) and during a fire (evacuation considerations).

The brochure warns that wildfire is "erratic, unpredictable and usually underestimated."

■ Planning for Survival (43)

Northwest Interagency Fire Prevention Group

This 18-page booklet is distributed by an organization representing the USDA Forest Service, USDI Bureau of Land Management, USDI Bureau of Indian Affairs, USDI National Park Service, Washington State Department of Natural resources and the Oregon State Department of Forestry. Address of sponsoring agencies are given for those who need additional copies or other information.

Five sections of the booklet include:

- Fire protection in forest and rural homes. Tells how fire protection is offered in forested areas.
- FIRESAFE features to consider in buying property. Gives considerations for purchasing forested or rural property.
- Lot development and building construction. Gives considerations for developing the lots and building a home in the wildlands.
- The existing home. This information is a guide to evaluating existing homes with recommendations for improvements in fire safety.
- Fire safety checklists.

■ Wildfire and Your Forest Home: Reduce the Risk (48)

Fremont Urban Wildfire Awareness Council (FUWAC)

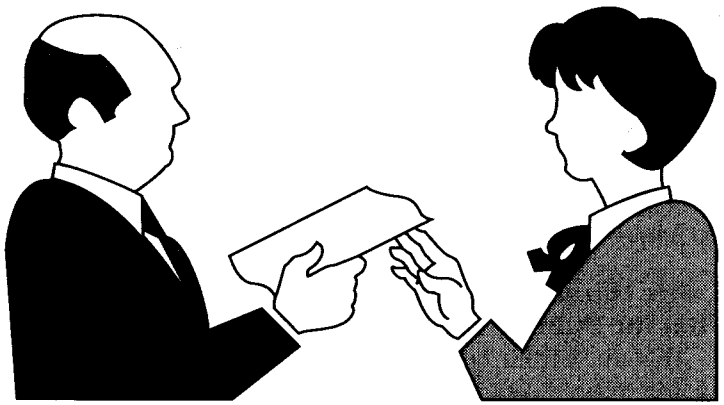
Eight Colorado and national agencies have joined together to form FUWAC, which provides residents with information on how to protect life and homes from wildfire. All Council members participated in developing the brochure. After Council members invited Fremont County Commissioners to attend a video and slide presentation, the commissioners agreed to fund the printing of the brochures, which will also be distributed to county residents along with their tax notices. Then the Canon City High School printing class volunteered to print the brochure at no cost for distribution in that town.

■ Cut the Brush and Protect Your House (7)

This informative newspaper article in the Riverside (Calif.) *Press-Enterprise* describes the benefits of fire-resistant landscaping in wildland/urban interface areas. For motivation the article begins with an overview of the 7,500-acre wildfire near Lake Elsinore, California, that destroyed 11 structures. But other homes directly in the path of the fire survived because the homeowners removed dangerous nearby vegetation and planted fire-resistant material that was both attractive to look at and safe to live with.

A model educational exhibit in Riverside called "Landscapes Southern California Style" provides an example of how this form of fire protection can work. Its goal is to reduce the type, size and arrangement of potential fuel for wildfires. The key is also to strike a balance between fire protection and soil erosion: the latter is said to be a particular problem on steep slopes after native vegetation is removed. Some of the guidelines given are:

- To stabilize slope areas, plant deep-rooted vegetation 3 to 6 inches high.
- Remove highly flammable native brush.
- Install zoned water-efficient and fire-resistant vegetation. Examples are succulents, plants with high moisture content and leathery leaves. Four zones are described for inclusion, starting with zone 1 immediately surrounding the house.



Readers were cautioned that just planting the right vegetation is not enough. It must also be properly maintained, especially with water. Drip irrigation was said to be one efficient solution to maintain moisture at the lowest cost. A spokesman for the California Department of Forestry reminded that water-starved plants push more oils into their leaf surfaces, making them more volatile.

A chart showing the characteristics of several fire-retardant plants accompanied the article. Trees, shrubs, ground covers and annual and perennial herbaceous plants were listed. For each one the chart indicated the plant's height, spread, flower color, flower season, and quantity of sun preferred.

■ When We Let Fires Rage (8)

This newspaper article from the Sacramento *Bee* discussed some of the results from the Yellowstone National Park fires of 1988. Much of the article reported concern with the nature of human intervention when a naturally caused fire starts in the park.

Turning to wildland/urban interface issues, the author observed: "Those who insist on building in the path of rivers have been required to obtain expensive insurance, but they still put a drain on emergency services when the floods come.

"Soon, if reason prevails, a home in the woods will carry an equally stiff tariff to provide fire protection services that will free Forest Service teams to do what they are paid to do: protect the forests and their multiple values to all of society, not just those who live there.

"Even so, as one who has such a home knows, the threat of uncontrollable wildfires will remain and those ravaged by it deserve what personal empathy and aid others can offer."

■ Annual Arson Statistics (10)

Volume 9, Number 2 of the *Target Arson: Update* newsletter published by the Insurance Committee for Arson Control features a report on the annual arson statistics released by the National Fire Protection Association. According to NFPA, one in every four persons arrested for arson is under age 15. It was the highest percentage of juvenile involvement for any FBI index crime. Also reported: "Of all the arson and suspected arson fires, national

estimates show the majority occur in brush, grass, forests, outdoor trash or rubbish, or other outdoor areas, but these outdoor arson offenses constitute the smallest share of arson offenses reported to the FBI."

Only about one out of every six (16%) arson offenses in 1987 was cleared by law enforcement agencies. Since 1980 the rate has remained between 16% and 19%.

■ Arson and the Wildland/Urban Interface (18)

Volume 9, Number 1 of the *Target Arson: Update* newsletter features an overview on the growing problem of intentional fires that threaten the growing number of people living in interface areas. According to NFPA statistics, 23 percent of the more than 500,000 wildland fires in 1986 were incendiary or of suspicious origin.

The wildland arsonists is said to have a distinct advantage over urban arsonists: Staring a fire in the wildlands is within anyone's reach without excessive risk and without sophisticated tools, and continuous surveillance is impossible.

Possible solutions are discussed, including public contact and education, thorough professional fire investigation techniques, surveillance and citizen participation.

■ When the Government Steps In (99)

This article from the May/June 1988 issue of *Fire Journal* is about making public policies to regulate the wildland/urban fire hazard. It describes three rationales for government action:

- When the nature of a commodity or service that people want is such that individual rights are inseperable from that service and it is virtually impossible to provide the service to some without providing it to all. For example, private enterprise may not want to provide a service needed by all when not everyone can pay for the service.
- When an individual user or provider of a service or commodity fails to account for the impact it will have on people who were not involved in the original tranaction. For example, when one permitted activity results is downstream water pollution, public policy may realign those rights and obligations.
- When people desire particular policies to be enacted without providing any clearcut rationale. For example, available evidence may not justify the need for public action, but popular support asks government to do act.

The authors say that the case for wildfire hazard management rests on the first two rationales. The article then discusses various considerations for this hazard management.

■ People, Fire and Wildland Environments (100)

This article appeared in *Population and Environment: A Journal of Interdisciplinary Studies*. Its focus is on the management problems associated with the wildland/urban interface.

The authors observe that there has been no shortage of awareness campaigns but note translating words into action is the real test. They caution that building awareness of policy problems is only the first step in any policy development process. Concern and interest must be translated into sustained policy action. They say that to do so requires capturing the attention of a broader audience, transferring technological improvmetns to all impacted interests, and systematicallly evaluating a broad range of innovative policy alternatives.

In particular, opportunities for technology transfer at the local level normally are present immediately following a wildfire disaster. The authors estimate that this window of opportunity "probably has a half-life of one year. This is the time when programs need to be available and ready to involve local officials and citizens."

Events at Palm Coast, Florida illustrate many of the problems and opportunities of managing wildfire in interface areas. A 1985 fire destroyed 99 expensive homes in a short period of time. A study of the fire showed some of the lessons learned and pointed to some needed changes. A follow-up study examined the rebuilding process, and it seems that many of the same mistakes are being repeated.

The authors describe the building industry as an overlooked group. Informing them better will help make them part of the solution and not the problem. Another consideration is to devise policy options that place the costs of hazardous living on those who take the risks. Thus it may be possible to alter the nature and costs of the choices people make in wildland/urban interface areas.

A list of 20 references follows the text.

■ Fire Hazards at the Urban-Wildland Interface: What the Public Expects (101)

This article from *Environmental Management*, Volume 14, Number 1, uses data drawn from the authors and others. It

discusses these items:

- how public knowledge and perceptions of fire policies and fire hazards change over time
- the kinds of policy responses homeowners prefer as a way of preventing interface fire hazards
- how citizens view their own obligations as participants in interface issues.

The article describes improving public awareness of interface wildfire problems, but it cautions that modifying an individual's behavior in regard to interface fire risks must also deal with important issues of individual incentives, the distribution of costs, and unanticipated policy impacts.

When public education is discussed, the authors say that educational materials will need to recognize that the public has grown more sophisticated. While educational strategies are important, it is also important, they say, to recognize that education alone is seldom sufficient to solve a problem. "Most solutions to public policy problems require a mix of market and regulatory approaches."

In concluding, the authors say, "Policy design for dealing with the urban-wildland fire interface must deal with the realities of public expectations just as it must deal with the realities of the biophysical environment."

■ When Wildfire Comes Knocking (102)

This is a chapter from the 1987 Yearbook of Agriculture from the U.S. Department of Agriculture. It provides an overview of wildland/urban interface issues, including background on the National Initiative. It listed the high priorities established by the first national conference on interface issues in Denver in 1986:

- Effective techniques and strategies to assess and manage fire hazards in interface areas
- Aids for planning, budgeting and training personnel for increased involvement in interface areas
- Effective ways to educate property owners, land developers, insurance carriers and local planners about vegetational fire problems and solutions
- Fundamental knowledge about the physics of fire behavior in interface areas
- Knowledge about the relationships of building design, material and landscaping to fire hazards and fire behavior.
- Improved understanding of why people build fire-prone homes in highly flammable areas.

■ Urban-Wildland Fire Risk Spurs Prescott to Act (103)

An article in the Arizona Daily Star on March 18, 1990 describes one city's approach to the interface fire problem. "How much money can Prescott save," asked Nevada State Forester Lowell Smith, "if the community does not burn down to the ground?"

The article was prompted by a wildland/urban interface conference in Prescott attended by 150 civic and governmental representatives. One of them, William Lockwood, director of Arizona's Division of Emergency Services, noted that "Our ability to create disasters far transends our ability to respond to them."

Another speaker was noted as saying that to be successful in dealing with interface fire issues you must create a coalition of alliances.

■ Wildland Fires (105)

The number of articles on wildland/urban interface issues is too large to note every one here. However, the July/August 1990 issue of *The Voice,* published by the International Society of Fire Service Instructors, is another example of the variety of periodicals addressing this subject.

The cover theme of the issue was wildland fires. Robert Swinford, USDA Forest Service National Fire Prevention Officer, wrote an overview of the interface situation in this newsletter going mostly to structural fire departments. However, these departments will do well to heed especially the final sentences of the article: "For the first time ever (in 1987), there were more fatalities on vegetation fires than structure fires. The majority of these fatalities were to members of rural and volunteer structural fire departments."

A second article in the same issue described wildland fire protection in recreation areas.

■ Wildland/Urban Interface Reference Materials (25)

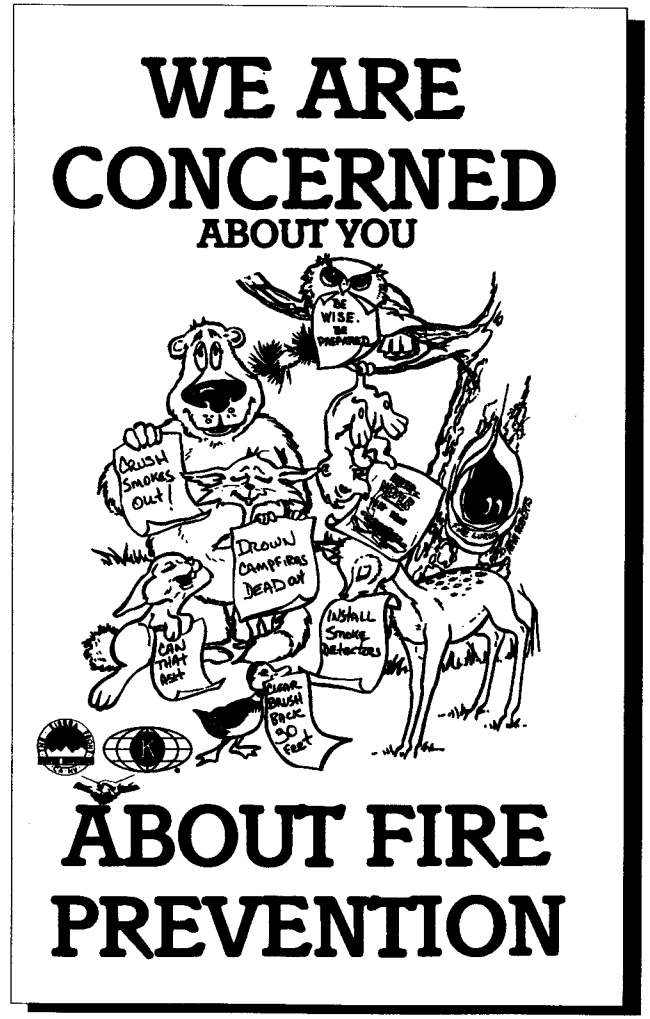
This guide to various published materials on interface subjects is described in the Research and Technology Section beginning on page 50. The guide lists almost 80 articles and ten periodicals.

■ **How Safe is Your Cabin? How Safe Are You? (52)**

This poster, distributed by the Utah Department of State Lands and Forestry, is printed in red for high visibility. In bold letters the poster gives the reader a reason to pause, if only briefly, to consider a cabin's fire safety. It then directs attention to the phone number to call in case of fire.

■ **What If You Came Home... and It Was Gone? (53)**

The intent of this poster is to capture the reader's attention through an emotional grabber of a headline. The resulting follow-up action is left to the prudent homeowner, who would be expected to pause to consider the consequences of not only the burned structure, but also lost possessions, destroyed scenic beauty and possibly threatened lives. The poster was jointly sponsored by Kiwannis International, USDA Forest Service and the California Department of Forestry.

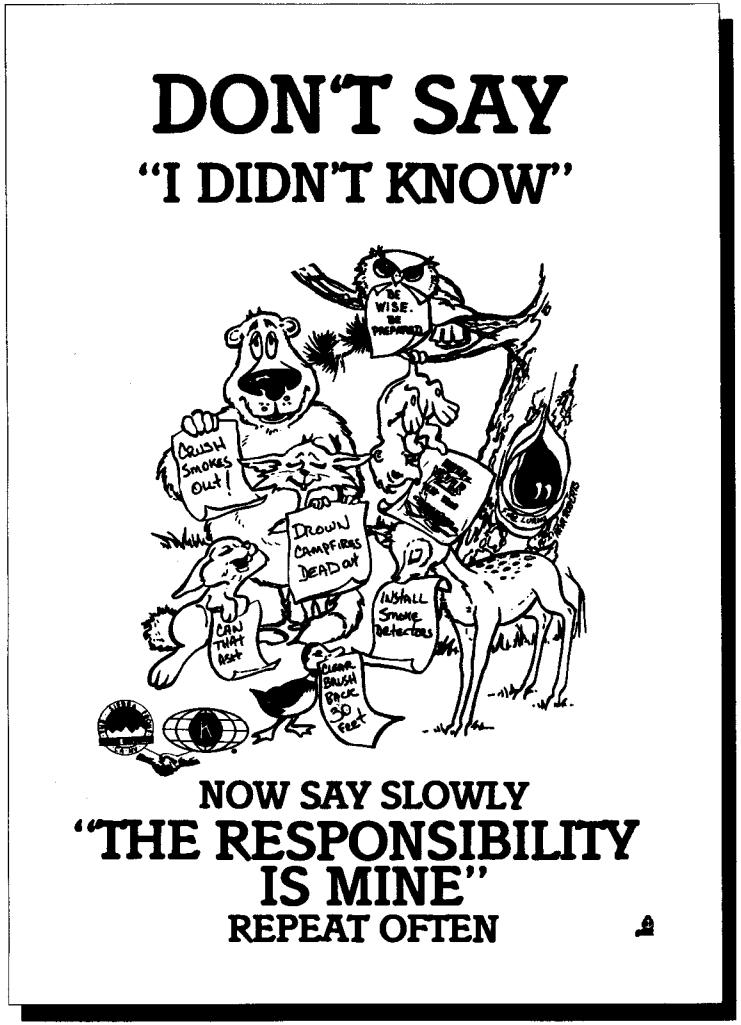


■ **Do a Good Job with Defensible Space (54)**

This poster is printed on bright yellow paper stock to increase visibility. It presents seven ways to make a home more fire safe. It is another in the series of posters produced by the Sierra Front Wildfire Cooperators.

■ **We Are Concerned About You (55)**

Another poster in the same series uses animals to urge fire safety, for their benefit as well as for the homeowners.



■ **Don't Say "I Didn't Know." (56)**

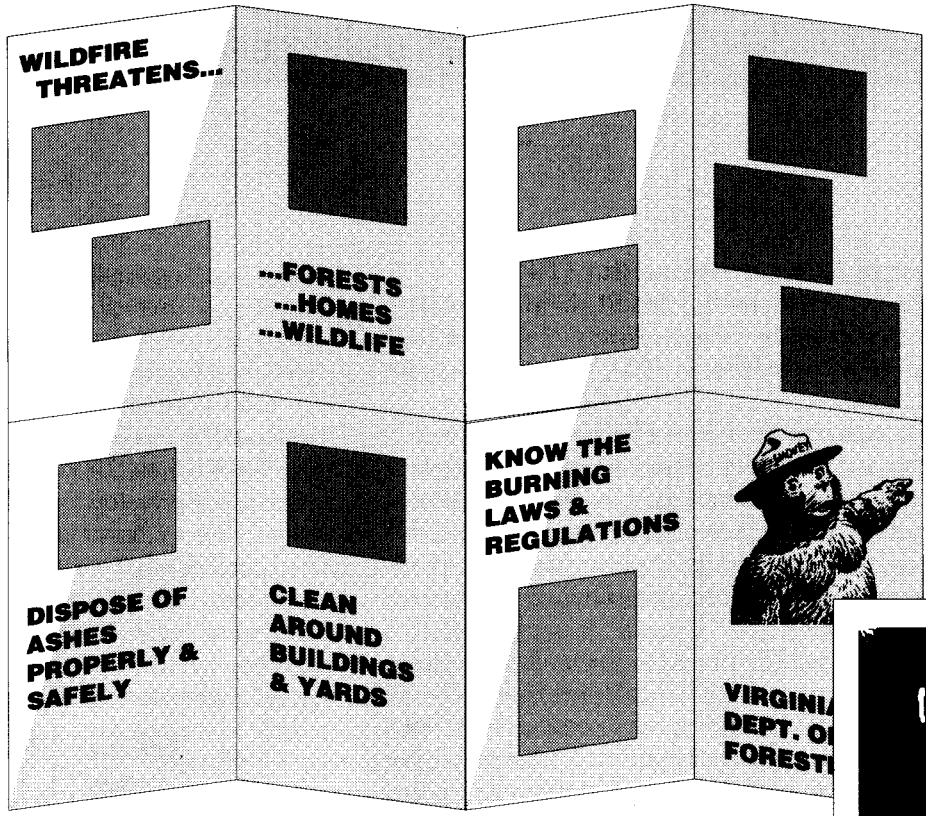
Again using animals to present fire safety tips, this Sierra Front Wildfire Cooperators poster asks readers to keep in mind that the responsibility for fire prevention is theirs.

■ **Your Place or Mine? (57)**

This poster by the Lake Tahoe Kiwannis Club has a simple but effective fire prevention message.

■ **Examples of Hazard Reduction on a Forest Homesite (59)**

This poster-size sheet by the Missoula County Fire Protection Association, Montana, shows several areas around a homesite where prevention action may be necessary.



■ **Wildfire Threatens Forests, Homes and Wildlife (46)**

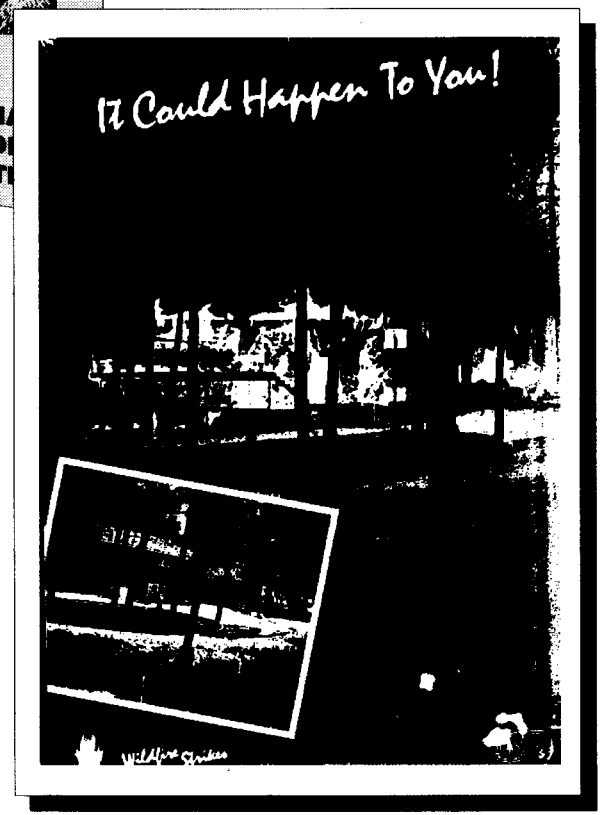
This large display features eight panels, each 4 by 2 feet, to command attention and present more information than is possible with single posters. Color photos and large type help attract passers-by.

Each panel has a specific purpose:

- Title panel
- "Safeguard Your Home in the Forest." Photos show good and bad preparation
- "Virginia's Forest Beauty Attracts Many Homeowners to Environmental Living."
- "A Shake Roof is Attractive: Keep it Clean."
- "Dispose of Ashes Properly and Safely."
- "Clean Around Buildings and Yards."
- "Know the Burning Laws."
- "Presented by the Virginia Department of Forestry."

■ **Is Your Home Fire-Safe? (60)**

Another poster sheet by the Missoula County Fire Protection Association also provides safety tips in a graphic form.



■ Wildfire News & Notes Newsletter (104)

The members of the National Wildland/Urban Interface Fire Initiative began sponsoring the *Wildfire News & Notes* (previously *Wildfire Strikes Home)* newsletter in 1987, with 20,000 copies distributed each issue.

The first edition gave an overview of the problems related to the interface issue, and interested persons were invited to begin signing up for the planned Wildland Fire Management Section of the National Fire Protection Association. Readers were also notified of a special satellite broadcast, the first of a series to focus on interface, and there were extensive new findings reported on the Florida Palm Coast Fire.

The second issue of 1987 reported on the availability of the first edition of the 96-page report, Wildfire Strikes Home. Also in this issue was a resolution from the National Association of State Foresters, in which that organization offered "to commit the Association and its members to a full partnership role" in the wildland/urban interface initiative.

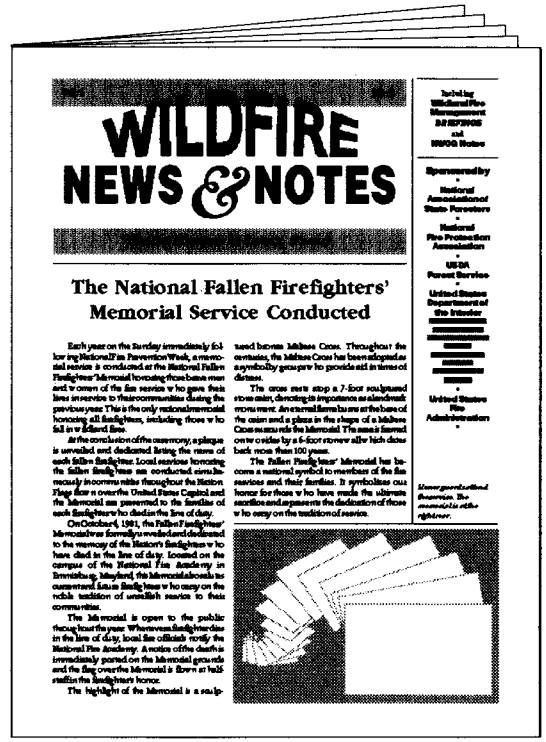
The third issue headline stated: "Wildland Fire Death Toll Exceeds 200, But Did the Public Notice?" That article discussed the challenge of overcoming public apathy facing everyone involved in the initiative. Another article looked back at the disastrous 1963 fires in the New Jersey Pine Barrens and asked the question, "Can It Happen Again?"

More than a page of letters to the editor in the fifth issue indicated growing interest in the newsletter and growing participation as well. Other pages were devoted to excerpts from presentation from the recent symposium in Montana, "Protecting People and Homes from Wildfire in the Interior West."

The first edition of the next year featured a cover story on roof covering regulations. Another feature was on the work of the National Wildfire Coordinating Group. That edition also said good-bye to Wildland/Urban Interface Initiative Program Manager John Marker, who had done so much to help start up the growing involvement in interface issues. John moved to a new assignment in the Pacific Northwest Region.

Later cover headlines show the diversity of information presented by this newsletter:

- The Wildland/Urban Interface Initiative in North Carolina.
- Fire Suppression Agreement Signed with Mexico.
- Fire Prevention Plans Mitigate Wildland/Urban Interface. Dangers in Arizona and Virginia.
- International Wildfire Conference Coming to Boston in July.
- Critical Incident Stress at Wildland Fires.


WILDFIRE NEWS & NOTES

The National Fallen Firefighters' Memorial Service Conducted

■ Wildfire Strikes Home Fire Prevention Kit (11)

The U.S. Forest Service and the Bureau of Land Management have joined forces to prepare an extensive, multimedia kit for personnel conducting fire prevention tasks in interface areas in the region surrounding the forest. The kit even comes stored in a handy plastic case.

The parts include:

- Inspection forms. A residential inspection form comes with a carbon copy so that the resident and the inspector can keep a copy. The form indicates when a follow-up inspection will be made, and it contains a space for imprinting a local contact for further information.
- Self-inspection mailer. For use in lower-priority areas, this mailer allows residents to make their own inspections according to the supplied checklist. With their signature on the pre-addressed response card, residents "certify that all fire hazards on the property have been abated."
- Poster. A dramatic color poster shows an attractive interface home seen through the trees; it also shows the same home and trees totally engulfed in flames. The printed message reminds: "It could happen to you!"

- Door hangers. Version 1 is used in an area where fire has occurred. It shows the same burning home in the interface, with the headline, "Your home has just been threatened!" Anyone with information is asked to contact the listed authorities. Version 2 informs residents, in an abbreviated form, of their fire protection responsibilities. It could also be used by volunteers as information to residents.

- Post cards. These two examples are similar to the door hangers and are postcard-size versions of the poster, with a different reverse messages.
- Flip book. This is used with smaller resident groups. Each page illustrates the need and reasons for incorporating firesafe measures around residences.
- Brochure. This general purpose brochure informs the reader of all aspects of the urban interface problem. It provides information on fire safety and what to do if a wildfire threatens.
- Activity book. Presents puzzles, coloring sheets and other activities focusing on the interface problem for kids.
- Do-it-yourself kits. In four volumes these kits are intended to provide users with instructions and camera-ready artwork in order to easily produce localized materials without going through an ordering process.
- Video. For groups or individuals, the video points out the need for and the techniques of incorporating firesafe measures in and around the home.
- Sun screen. These are for parked agency vehicle windshields; they boldly proclaim the fire prevention message.

■ "I'm Concerned" Public Education Campaign (58)

The Sierra Front Wildfire Cooperators have conducted an aggressive public education campaign around the theme, "I'm concerned."

Within the previous 10 years wildfires destroyed about 50 homes and burned thousands of acres in this region of western Nevada and eastern California incorporating the areas of Reno, Lake Tahoe and Carson City. The Sierra Front Wildfire Cooperators began at an interagency fire prevention workshop in 1988. Attendees included the Lake Tahoe Kiwannis Club, and this organization was to become an active cooperator and supporter.

The objective of the resulting campaign was to saturate the region with a variety of "I'm Concerned" fire safety messages, with the intent of keeping the message on the minds of residents and visitors alike. The Kiwannis provided the initial funds for start-up. A variety of items were used to reinforce the campaign theme:

- Lapel buttons. More than 22,000 lapel buttons were distributed. The "I'm Concerned" message was set in orange flames on a white background.
- Tent cards and poster. Businesses help prominently display 6,000 tent cards and 2,000 posters with the familiar message.
- Bumper stickers. Courtesy of the California Division of Forestry, 10,000 bumper stickers were distributed.
- Banners. Large street banners, many donated by a local graphic artist, were strategically displayed in the communities.
- Litter bags. The casino industry funded 100,000 auto litter bags with the logo message.

- Television coverage. A news conference introduced the campaign.
- Radio. Several celebrities completed public service announcements incorporating the theme.
- Newspapers. Articles, photos and editorials were part of the program.
- Highway readerboard. An interstate highway readerboard was programmed to repeat the theme message.

The campaign managers believe this program has contributed to a significant reduction in human-caused fires. Just as important has been the successful partnership between the agencies of the Sierra Front Wildfire Cooperators and the Lake Tahoe Kiwannis Club. Service clubs are community opinion leaders and are a valuable resources in terms of their willingness to help.

■ Wildfire Prevention Week Media Contacts (82)

The Michigan Interagency Wildfire Prevention Group prepared a special package of information with an extra emphasis on television weather forecasters. According to the promotion summary, "All seven of Michigan's fire fighting agencies have joined together to promote this special week." The media kit listed 10 activities for the week:

- Governor's declaration of Michigan Wildfire Prevention Week (April 16-22, 1989) and statewide observance.
- Weather forecasters from 14 Michigan stations provided wildfire safety tips all week during their weather forecasts.
- National TV forecasters on two networks were asked to mention the seriousness of wildfires on their April 20 forecasts.
- Michigan Outdoors TV show host Fred Trost provided weekly statewide wildfire danger reports on his show during high wildfire danger months of April and May.
- Almost 5,000 state third graders participated in a special billboard design contest. Two winning designs were displayed statewide.
- Radio stations played special public service announcements to promote wildfire safety.
- Every Michigan public library received a videotape on fire prone property (see Videotapes material elsewhere in this edition).
- News releases and fact sheets were widely distributed. Information included details on the significant Michigan wildfires from the previous year.

- TV and radio interviews with wildfire prevention personnel.
- Local activities included equipment demonstrations, school programs, open houses and more.

■ *Wildfire: Beware & Prepare* Multimedia Program (96)

More than 100,000 residents have been trained with this multimedia package developed in 1988 for the British Columbia Forest Service in Canada. In 1990 the program will also be implemented in Alberta, New Brunswick, Newfoundland and Manitoba. It consists of a videotape, a booklet guide to presenting the program to residents, brochure checklists for forest homeowners, and posters announcing the program. The posters can be updated and personalized with date, time, location and contact person. The guide provides an outline of the seminar program, but allows the presenter (typically forest officers in district offices or rural fire departments) to insert relevant local information to augment the video messages. Camera-ready art-work can be ordered for announcements in local newspapers, or pre-recorded radio commercials and television public service announcements are also available to increase awareness.

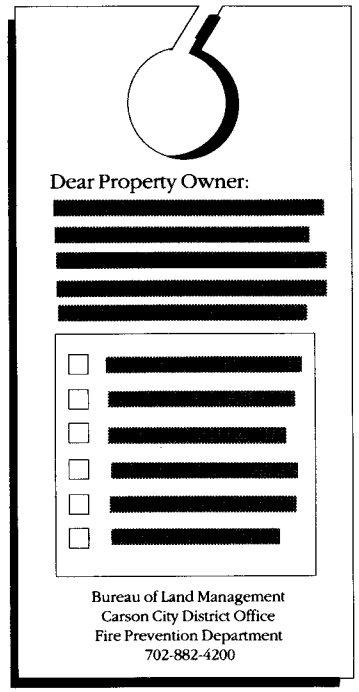
The 15-minute video presents the motivational fire scenes and interviews with fire victims who never believed they would lose their homes to wildfire. Checklists are also discussed.

■ Bureau of Land Management Door Hanger (48)

The Canon City (Colorado) District of BLM prepared a door hanger distribution in interface areas. The message is a reminder of the possibility of wildfires in the area, along with a wildland fire checklist.

The hanger also offers a contact phone number for those who are motivated to seek additional information.

This provocative thought is also stated: "Please remember you are only as safe as your neighbor, so encourage residents around you to clean up their property." Peer pressure has excellent potential to break through the natural tendency toward apathy by some adults who are addressing other priorities.



1 Wildfire Hits Home (Videotapes)
Washington State Department of Natural Resources
201 John A. Cherberg Building, Mail Stop QW-21
Olympia, WA 98504

2 Dream Home (Videotapes)
Joe Hughes, Assistant State Firewarden, 609-292-2520
New Jersey Division of Parks and Forestry
CN 404, Trenton, NJ 08625

3 Wildfire '87: Decisionpoint for the Future (Videotapes)
Boise Interagency Fire Center

4 A Special Place, A Special Peril: Inspection of Fire-Prone Property (Videotapes)
See address at No. 5.

5 A Special Place, A Special Peril: Your Way to Help (Videotapes)
Michigan Interagency Wildfire Prevention Group
Arthur Sutton, Michigan DNR, 517-373-1226
P.O. Box 30028, Lansing, MI 48909

6 Draft Story Board (Videotapes)
Indiana, Illinois, Iowa and Missouri
Roy Hatcher, Iowa Conservation Commission
2404 S. Duff Ave., Ames, IA 50010

7 Cut the Brush and Protect Your House (Articles)

8 When We Let the Fires Rage (Articles)
Sacramento Bee, California

9 Black Tiger Fire Case Study (Videos) (Reports)
Boise Interagency Fire Center Supply

10 Target Arson: Update (Articles)
Vol. 9, No.2, Insurance Information Institute, 212-669-9221
110 William St., New York, NY 10038

11 Fire Prevention Kit: It Could Happen to You (Miscellaneous)
H.R. McClellan, Sierra National Forest
Federal Building, 1130 O St., Fresno, CA 93721

12 Protecting People and Homes From Wildfire in the Interior West (Conferences)
Intermountain Research Station, USDA Forest Service
406-721-5697, P.O. Box 8089, Missoula, MT 59807

13 Wildland/Urban Interface Workshop, Bend, Oregon (Conferences)
Intermountain Research Station, USDA Forest Service
See address at No. 12.

14 Interagency Wildland Prevention Conference, Lincoln City, Oregon (Conferences)
Intermountain Research Station, USDA Forest Service
See address at No. 12.

15 Interagency Wildland Prevention Conference, Seattle, Washington (Conferences)
Intermountain Research Station, USDA Forest Service
See No. 12.

16 Protecting People and Homes from Wildfires in the Black Hills (Conferences)
Wildland/Urban Task Force, c/o South Dakota Division of Forestry
3305 1/2 W. South St., Rapid City, SD 57702

17 Up In Smoke: Wildfire Strikes Home in Georgia (Conferences)
Georgia Forestry Commission, Jim Gillis, Chairman
P.O. Box 819, Macon, GA 31298-4599

18 Target Arson: Update, Vol. 9, No. 1
Arson and the Wildland/Urban Interface (Articles)
Insurance Information Institute, 212-669-9221
110 William St., New York, NY 10038

19 Fire Safe California Workshops: Survival by Design (Conferences)
California Department of Forestry and Fire Protection
Resource Building, P.O. Box 94246, Sacramento, CA 94244-2460

20 Fire Protection in the Wildland/Urban Interface: A Montana Viewpoint (Reports)

21 Fire Seasons in Eastern and Southeastern Massachusetts (Reports)
Robert Winston, 617-834-9413
456 Lincoln St., Duxbury, MA 02332

22 NFPA Summary of Activities: Second Phase, October 1987—September 1988 (Reports)
National Fire Protection Association
1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269

23 Wildfire Strikes Home in Texas (Conferences) (Reports)
Bill Terry, Head, Training Section, Forest Fire Control
Texas Forest Service, P.O. Box 310, Lufkin, TX 75902-0310

24 Palm Coast Wildland/Urban Wildfire Study (Mitigation Plans)
M.C. Long, Florida Division of Forestry
3125 Conner Blvd., Tallahassee, FL 32399-1650

To locate the description of an item from this index, note the item number and item category (in parentheses) and find the beginning page number for the indicated category on the Contents Page or on the Section Directory on Page 36. Items are arranged in numerical order within the categories.

Addresses are as complete as possible from the submitted material. In some case no address is available.

25 Wildland/Urban Interface Reference Materials (Research and Technology)
Boise Interagency Fire Center

26 Wildland/Urban Interface Fire Protection Plan for the Cinder Hills Interface Protection Area (Mitigation Plans)
State Land Department, 1616 W. Adams, Phoenix, AZ 85007

27 Fire Safety Considerations for Developments in Forested Areas: A Guide for Developers and Planners (Mitigation Plans)
Kittitas County Fire Prevention Co-op, State of Washington Department of Natural Resources
See address at No. 1.

28 An Action Plan for Protecting Rural/Forest Lands from Wildfire (Mitigation Plans)
State of Oregon, Department of Forestry, 503-378-2511
2600 State St., Salem, OR 97310

29 Assessment for Threat from Wildfire for the Manorlands Development (Mitigation Plans)
Richard Klason, State Forester
Utah Division of State Lands and Forestry
355 West North Temple, 3 Triad Ctr., Suite 400
Salt Lake City, UT 84180-1204

Boise Interagency Fire Center
Attn: Supply
3905 Vista Avenue, Boise, Idaho 83705

Item Numbers 9, 85, 86, 89, 90 and other wildland/urban interface materials are available either free or at nominal charge from the Boise Interagency Fire Center. Note: Orders must be from agencies or organizations, not private individuals. Orders from other than federal wildland fire agencies or state land protection agencies will receive an 18 percent surcharge on the bill. **Write for a catalog with ordering information and current prices of all pamphlets, booklets, brochures and videos.** Videos are available in VHS format only. Phone orders are not accepted. However, for additional questions regarding ordering procedures, contact the BIFC Supply Office, 208-389-2542. Questions regarding billing procedures can be addressed to BIFC Finance Office at 208-389-2533.

NFES 2136	Wildfire 90, Wildfire Strikes Home video	NFES 2134	Building Interagency Cooperation booklet
NFES 2076	Protecting Your Home from Wildfire video	NFES 2135	Building Interagency Cooperation video
NFES 2104	Protecting Your Home from Wildfire pamphlet	NFES 2129	Wildfire 87 video
NFES 2102	Firefighter Safety in Wildland/ Urban Interface Fires video	NFES 2130	Black Tiger Fire Case Study booklet
NFES 2103	Firefighter Safety in Wildland/ Urban Interface Fires booklet	NFES 1247	Black Tiger Fire Case Study video
NFES 2106	Wildland Home Fire Risk Meter	NFES 1209	Wildfire Strikes Home video (and others)

30 The Granada Hills Brush Fire of December 9, 1988 (Reports)
Donald Manning, Chief Engineer and General Manager
Los Angeles City Fire Department
200 North Main Street #1020, Los Angeles, CA 90012

31 Guidelines for a Teamwork Approach to Multiagency Fire Management (Cooperative Agreements)
Missoula County Fire Protection Association
5115 Highway 93 South, Missoula, MT 59801

32 Wildfire Safety Guidelines for South Dakota Rural Homeowners (Guidelines and Ordinances)
Keep South Dakota Green Association, P.O. Box 3, Pierre, SD 57501

33 Wildfire Protection: A Guide for Homeowners and Developers (Guidelines and Ordinances)

34 Fire Safety Considerations for Developments in Forested Areas: A Guide for Homeowners, Home Buyers and Builders (Guidelines and Ordinances)
North Carolina Department of Natural Resources
Division of Forest Resources P.O. Box 27687, Raleigh, NC 27611

35 Wildfire Hazards and Residential Development: Identification, Classification and Regulation (Guidelines and Ordinances)
Utah Division of State Lands and Forestry
See address at Number 29

36 Fire Prevention Handbook: Fire Prone Property Program (Guidelines and Ordinances)
Prevention Officer, Division of Resource Management
Wisconsin Department of Natural Resources
101 S. Webster St., GEF II, Box 7921, Madison, WI 53707-7921

37 Preventing Fires in the Wildland/Urban Interface: How the Rural/Metro Fire Department Does It (Reports)

38 Virginia Department of Forestry Wildland/Urban Interface Fire Protection Handbook (Guidelines and Ordinances)
John Graff, Chief, Fire Management
Virginia Department of Forestry, 804-977-6555
P.O. Box 3758, Charlottesville, VA 22903

39 Sample Zoning Ordinance for Fire Prone Property, Chisago County, Minnesota (Guidelines and Ordinances)
George Meadows, 612-296-4490
Minnesota DNR-Forestry, Box 44 DNR Building,
500 Lafayette Road, St. Paul, MN 55155-4044

40 Gateway Interagency Fire Front (Cooperative Agreements)
Caribou National Forest, 208-236-7500
Federal Building, 250 S. 4th Ave., Pocatello, ID 83201

41 Arizona Fires Map (Research and Technology))
Arizona State Forestry Division

42 Town Forest Fire Warden Training Package (Coop. Agreements)
Leslie Wiles, Planning and Training, 207-289-4990
Maine Forest Service, State House Station 22
Augusta, ME 04333

43 Planning for Survival (Brochures)
Northwest Interagency Fire Prevention Group

44 Trail's End Woodland Home Development Plan Update (Mitigation Plans)
John Graff, Virginia Division of Forestry
See address at Number 38.

45 Marking Homes for Dangerous Conditions (Mitigation Plans)
Philip Stromberg, Wisconsin Department of Natural Resources
See address at Number 36.

46 Panel Display Unit (Posters)
John Graff, Virginia Division of Forestry
See address at Number 38.

47 Wildfire and Your Forest Home: Reduce the Risk (Brochures)
Freemont Urban Wildfire Awareness Council, Colorado
See address at No. 48.

48 Bureau of Land Management Door Hanger
Carson City, Colorado District Office, Bureau of Land Management
Fire Prevention Department, 702-882-4200

49 Closest Forces Agreement, Utah (Cooperative Agreements)
Mike Neilson, Assistant FMO, Fishlake National Forest,
801-896-4491, 115 E. 900 North, Richfield, UT 84701

50 Northern Rockies Coordinating Group (Cooperative Agreements)
James Mann, Director, A&FM Northern Region, 406-329-3402
Federal Building, P.O. Box 7669, Missoula, MT 59807

51 North Idaho Fire Prevention Cooperative (Coop. Agreements)
Dave Aldrich, Forest Staff Official
Idaho Panhandle National Forest
1201 Ironwood Dr., Cover D'Alene, ID 83814

52 How Safe is Your Cabin? (Posters)
Utah Department of State Lands and Forestry
See address at Number 29.

53 What If You Came Home, And It Was Gone? (Posters)
California Department of Forestry and Fire Protection
See address at No. 19.

54 Do a Good Job With Defensible Space (Posters)
Sierra Front Wildfire Cooperators
855 Eastlake Blvd., Carson City, NV 89704

55 We Are Concerned About You (Posters)
Sierra Front Wildfire Cooperators
See address at Number 54.

56 Don't Say I Don't Know (Posters)
Sierra Front Wildfire Cooperators
See address at Number 54.

57 Your Place or Mine? Prevention is Up to You (Posters)
Lake Tahoe Kiwannis Club

58 "I'm Concerned" Public Education Campaign (Miscellaneous)
Sierra Front Wildfire Cooperators
See address at Number 54.

59 Hazard Reduction Checklist for a Forest Homesite (Posters)
Missoula County Fire Protection Association, 406-251-5237
See address at Number 31.

60 Is Your Home Fire-Safe? (Posters)
Missoula County Fire Protection Association, 406-329-3750
See address at Number 31.

61 A Partnership for the People: Home Fire Safety (Brochures)
M.C. Long, Florida Division of Forestry
See address at number 24.

62 A Partnership for the People: Mobile Home Safety (Brochures)
M.C. Long, Florida Division of Forestry
See address at number 24.

63 A Partnership for the People: Woodland Homes Fire Safety (Brochures)
M.C. Long, Florida Division of Forestry
See address at number 24.

64 A Partnership for the People: Florida's Trash Burning Laws (Brochures)
M.C. Long, Florida Division of Forestry
See address at number 24.

65 Inside and Outside Your Home (Brochures)
Florida Division of Forestry and Palm Beach County Fire Rescue, 683-9100

66 Fire Safety for Woodland Homes (Brochures)
Volusia County Department of Fire Services
P.O. Box 2114, Deland, FL 32721-2114

67 Help Protect Your Hideaway Home (Brochures)
North Carolina Forest Service
P.O. Box 27687, Raleigh, NC 27611

68 Help Protect Your Hideaway Home (Brochures)
Michigan Interagency Wildfire Prevention Group
Michigan DNR, P.O. Box 30028, Lansing, MI 48909

69 Forest Fires Burn More Than Trees: Be Aware of Fire Prone Property (Brochures)
Wisconsin Department of Natural Resources–Forestry
P.O. Box 7921, Madison, WI 53707

70 Your Home in the Line of Fire! (Brochures)
Southern Group of State Foresters and USDA Forest Service Southern Regions

71 Protect Your Forest Home or Summer Cottage (Brochures)
Ontario Ministry of Natural Resources, Aviation & Fire Mgmt. Centre
P.O. Box 310, Sault Ste. Marie, Ontario P6A 5L8 Canada

72 Could Your Montana Home Survive a Wildfire? (Brochures)
Missoula County Fire Protection Association
See address at Number 31.

73 How to Help Your Home Survive a Forest Fire (Brochures)
Tennessee Department of Conservation

74 Wildfire is the Enemy of your Forest Home: Reduce the Risk (Brochures)
Middle-Atlantic Interstate Forest Fire Protection Compact
Don Van Hassent, Maryland Forest, Park and Wildlife
Tawes State Office Building, 301-974-3776
580 Taylor Ave., Annapolis, MD 21401

75 Wildfire: Are You Prepared for its Deadly Force? (Brochures)
Michigan Interagency Wildfire Prevention Group, 517-373-1275
c/o Michigan Department of Natural Resources– Forestry
P.O. Box 48909 or 30028, Lansing, MI 48909

76 Wisconsin Forest Fire Laws and Regulations (Brochures)
Wisconsin Department of Natural Resources–Forestry
P.O. Box 7921, Madison, WI 53707

77 Florida's Forestry Arson Alert Association Brochure and Bumper Sticker (Brochures)
3125 Conner Blvd., Tallahassee, FL 32399

78 Wildland Fire Dangers: Safety and Survival Precautions for Homeowners and Recreationists (Brochures)
Missoula County Fire Protection Association
See address at Number 31.

79 Burning is a Big Decision (Brochures)
Missoula County Fire Protection Association

80 Protect Your Summer Home (Brochures)
Utah Division of State Lands ad Forestry, 801-538-5508
3 Triad Center, Suite 400, Salt Lake City, UT 84180

81 Official Smokey the Bear Fire Prevention Club Kit
H.R. McClelland
See address at Number 11.

82 Wildfire Prevention Week Media Contacts (Miscellaneous)
Michigan Interagency Wildfire Prevention Group
See address at Number 75.

83 Rogue Valley Fire Prevention Cooperative Town Meetings (Conferences)

84 Memorandum of Understanding: Jackson County, Oregon, Department of Planning and Development and Rogue Valley Fire Service Agencies (Cooperative Agreements)

85 Building Interagency Cooperation (Videos) (Reports)
Boise Interagency Fire Center

86 Protecting Your Home From Wildfire (Videos) (Brochures)
Boise Interagency Fire Center

87 International Satellite Broadcast (Videos) (Reports)

88 Fire Management Study Group of the North American Forestry Commission (Reports)

89 Wildland Home Fire Risk Meter (Research and Technology)
Boise Interagency Fire Center

90 Fire Fighter Safety in Wildland/Urban Interface Fires (Videos) (Reports)
Boise Interagency Fire Center

91 International Conference: Meeting Global Wildland Fire Challenges (Conferences)

92 People and Fire at the Wildland/Urban Interface (Conferences) (Research & Analysis)
Report edited by Robert Gale and Hanna Cortner, U.S. Forest Service, Washington, DC

93 Governor's Conference on Rural/Suburban Fire Protection in Louisiana (Conferences) (Reports)

94 Proposed NFPA Standard 299: Protection of Life and Property from Wildfire (Guidelines and Ordinances)
National Fire Protection Association. See address at Number 22.

95 Communications Guidelines: Communicating the Wildland/Urban Interface Fire Problem (Guidelines and Ordinances)

96 Wildfire: Beware & Prepare Multimedia Program (Miscellaneous)
Third Wave Communications, Inc.
630-1050 W. Pender St., Vancouver, B.C. V6E 3S7 Canada

97 Wildland/Urban Fire Interface Workshop for Social Scientists (Conferences) (Reports)

98 Assessing the Ignition Risk to Structures in the Wildland/Urban Interface (Research and Technology)

99 When the Government Steps In (Articles)
Fire Journal, May/June 1988, National Fire Protection Association
See address at Number 22.

100 People, Fire and Wildland Environments (Articles)
Population and Environment: A Journal of Interdisciplinary Studies, Vol. 11, No. 4, Summer 1990

101 Fire Hazards at the Urban-Wildland Interface: What the Public Expects (Articles)
Environmental Management, Vol. 14, No. 1, pp. 57-62

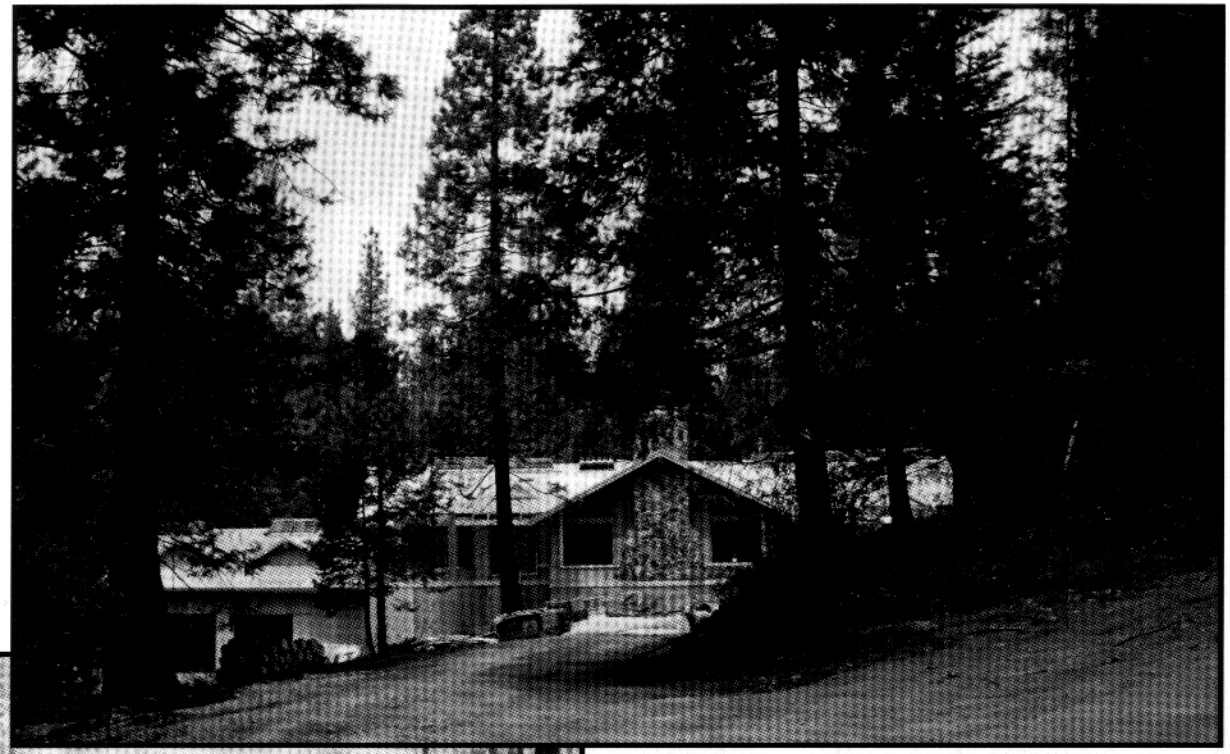
102 When Wildfire Comes Knocking (Articles)
1987 Yearbook of Agriculture. Copies for sale from Superintendent of Documents, Washington, DC 20402.

103 Urban/Wildland Fire Risk Spurs Prescott to Act (Articles)
March 18, 1990, Arizona Daily Star

104 Wildfire Strikes Home [now Wildfire News & Notes] (Newsletters)
Bill Baden, National Fire Protection Association
See address at Number 22.

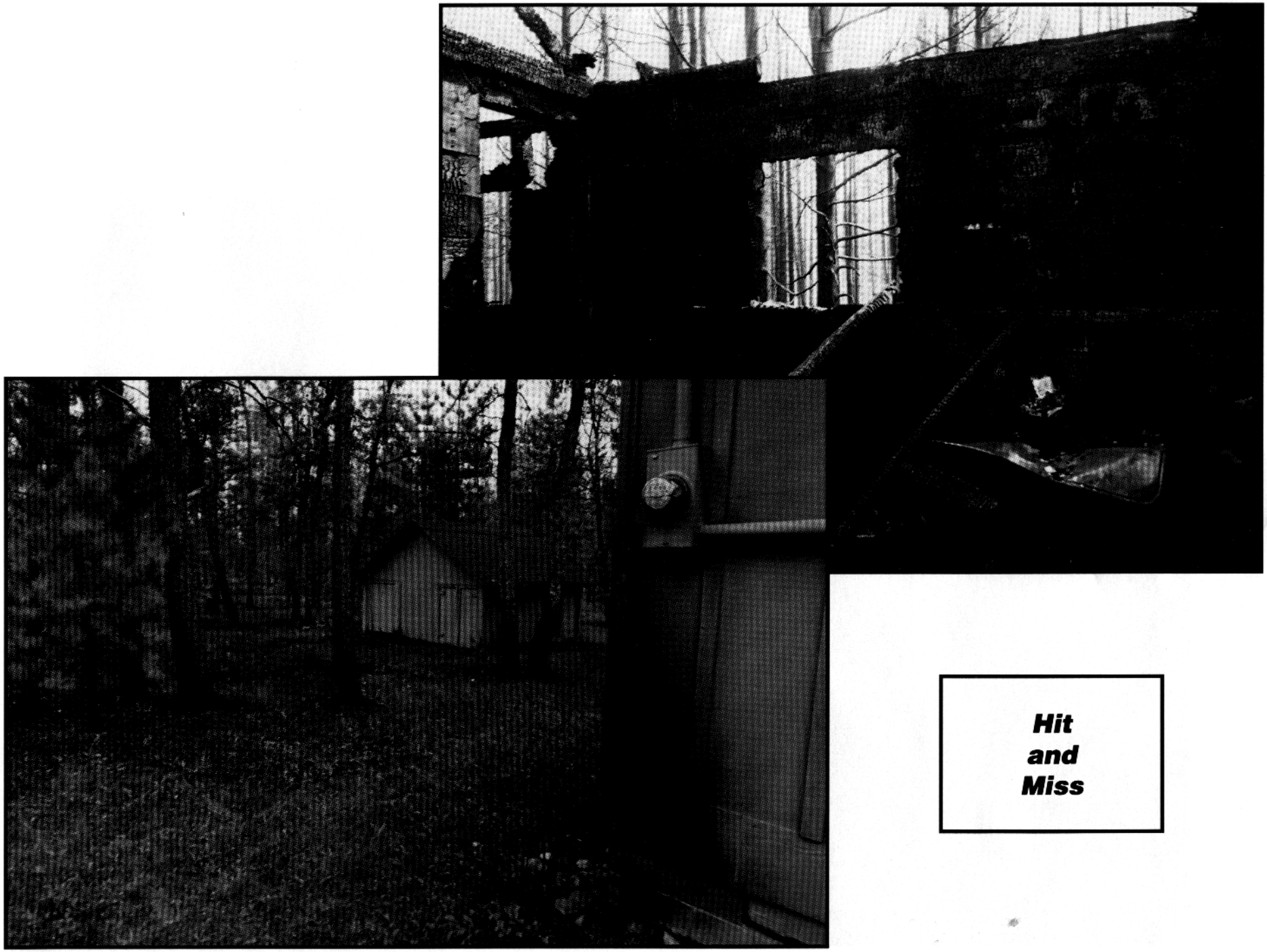
105 The Wildland/Urban Interface in America (Articles)
The Voice, July/August 1990, published by the International Society of Fire Service Instructors, 30 Main Street, Ashland, MA 01721

106 Boise Front Area Agreement (Cooperative Agreements)
USDI Bureau of Land Management, Idaho State Office
3380 Americana Terrace, Boise, ID 83706

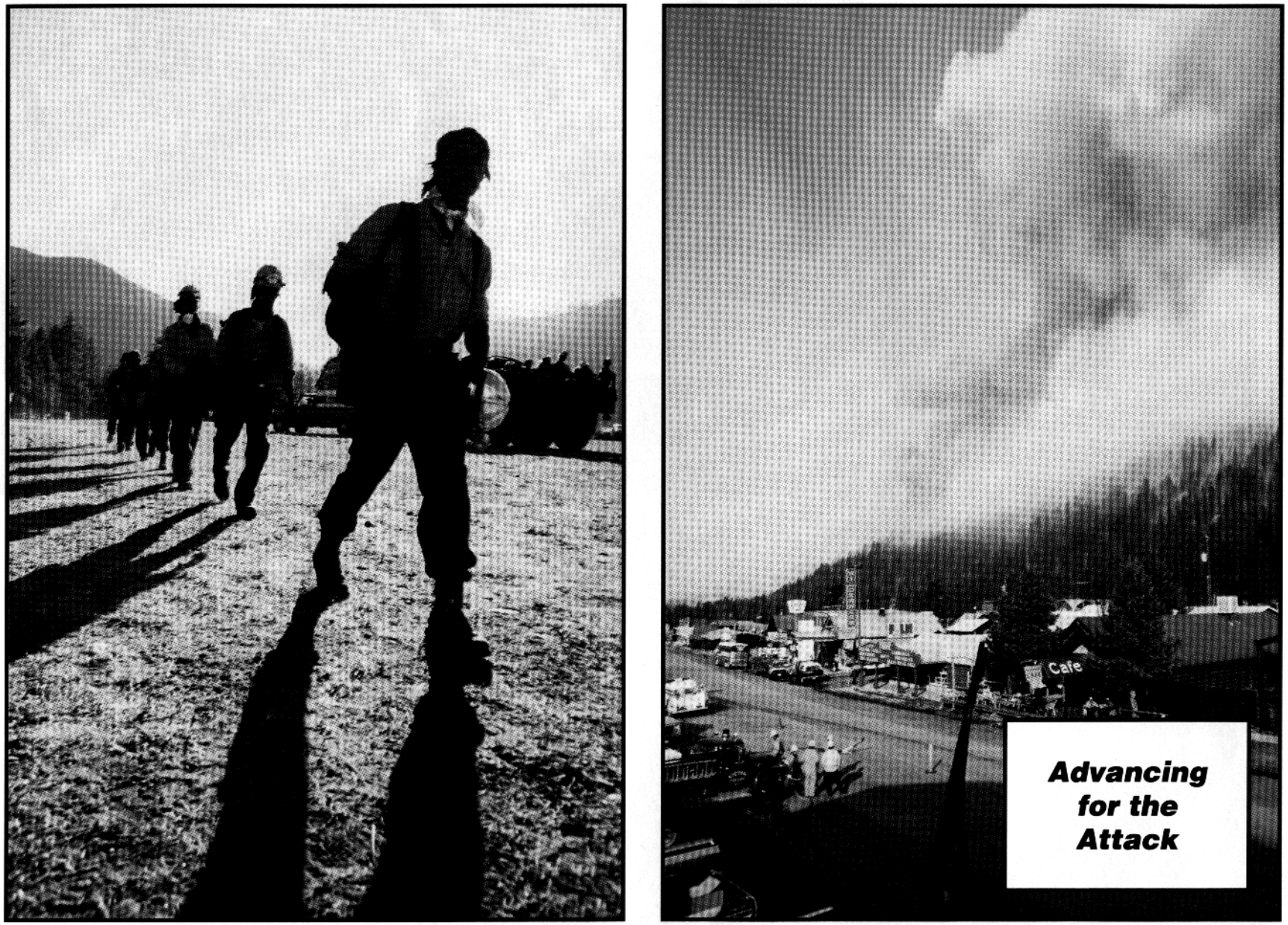


Dream and Disaster

Standing Alone

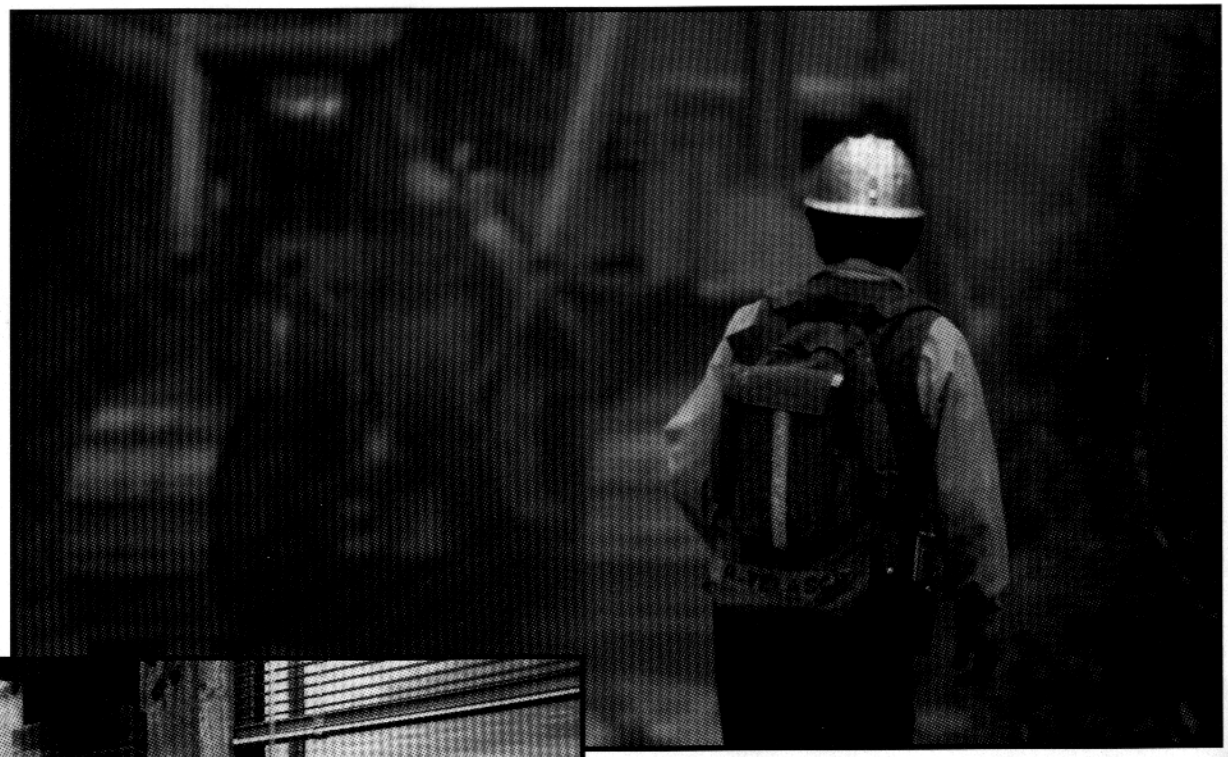


Hit and Miss


Cafe
Advancing
for the
Attack


No Rest
at
Night

No
Fire
Hydrants



Waiting and Working

Blue Skies,
Plus
Smoke

Source List of Organizations

For additional information, contact your local fire department or forestry agency, or contact the following organizations:

National Fire Protection Association
Public Fire Protection Division
1 Batterymarch Park
P.O. Box 9101
Quincy, MA 02269-9101
617-770-3000

United States Department of Agriculture Forest Service
Fire & Aviation Management
P.O. Box 96090
Washington, DC 20090-6090
703-235-3220

National Association of State Foresters
444 N. Capitol Street, NW
Washington, DC 20001
202-624-5415

Boise Interagency Fire Center
Publications Management System
3905 Vista Avenue
Boise, ID 83705
208-389-2512